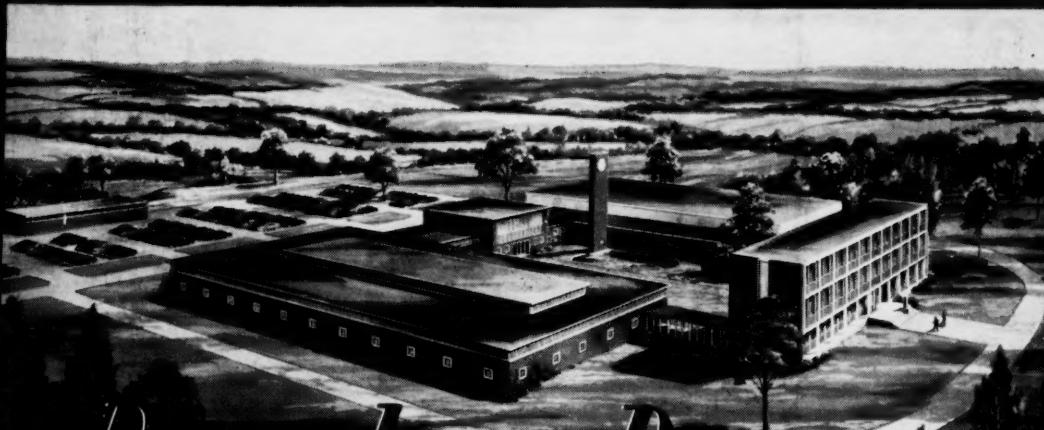


MODERN Machine Shop



Broaching Pioneers

WITH A NEW PERSPECTIVE

What's new in broaching? For many years, industries throughout the world have turned to Detroit Broach for the answer to that question. It has been this company that has pioneered many of the most important advancements in broaching techniques and the design of broaching equipment.

What's new in the manufacture of broaching equipment? Again Detroit Broach provides the answer in this new plant—designed to provide the most efficient production methods to be found in the industry.

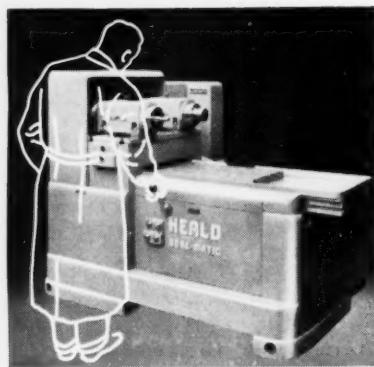
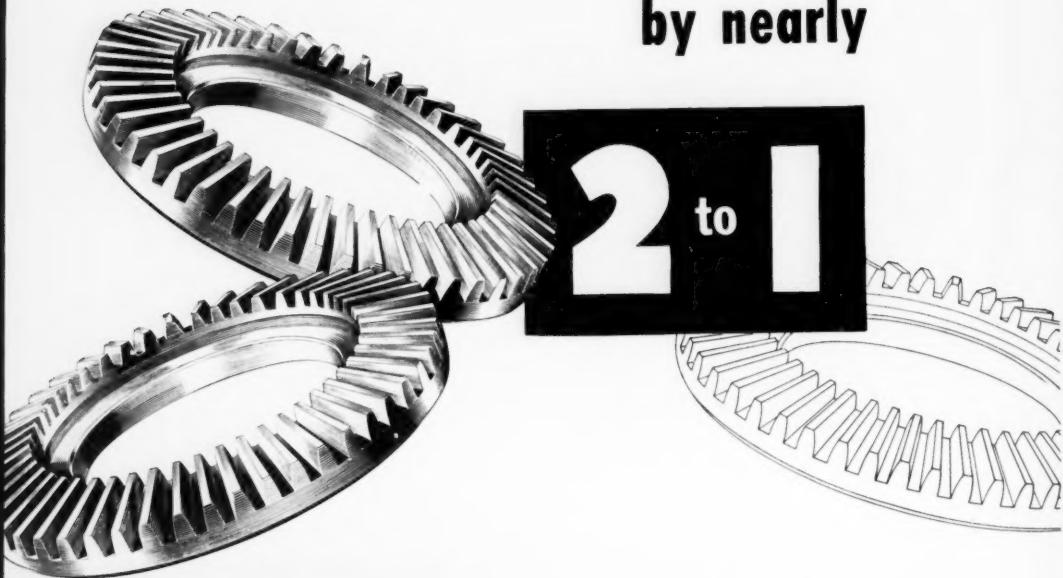
Whenever broaching is a consideration in your production operations, you are sure to find Detroit Broach leading the way in engineering and manufacturing competence and in ability to be of real service to you.

Shown above are the new plant and offices of Detroit Broach Company, at Rochester, Michigan—just outside Detroit. Designed by Sture Frolen of Stockholm, architect of many of Sweden's finest modern buildings, it embodies many important advancements that contribute to smoothly-organized production and the finest of working conditions for all employees.

OFFICES IN PRINCIPAL CITIES
THROUGHOUT THE WORLD

Detroit Broach COMPANY
ROCHESTER, MICHIGAN

Heald Internal outproduces older equipment by nearly



This Heald Model 271 Gage-Matic grinds ring gear bores nearly as fast as two older machines.

THIS might be just another case history, except for one thing—a production increase of almost 100 per cent. And that's a pretty important saving in any production man's language.

A Heald Model 271 Gage-Matic was installed by an automotive manufacturer for grinding the bore of differential ring gears. A simple, straightforward operation—yet it was found that this new Internal out-produced *two* older machines by almost two-to-one! Why? Because all of the new Heald machines have been designed to save time and effort on *every phase* of the operating cycle. It all adds up to a substantial increase in production efficiency.

Remember—when it comes to precision finishing, it pays to come to Heald.

Internal and Rotary
Surface Grinding Machines
and Bore-Matics



THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

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MODERN Machine Shop

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NUMBER 5

OCTOBER, 1953

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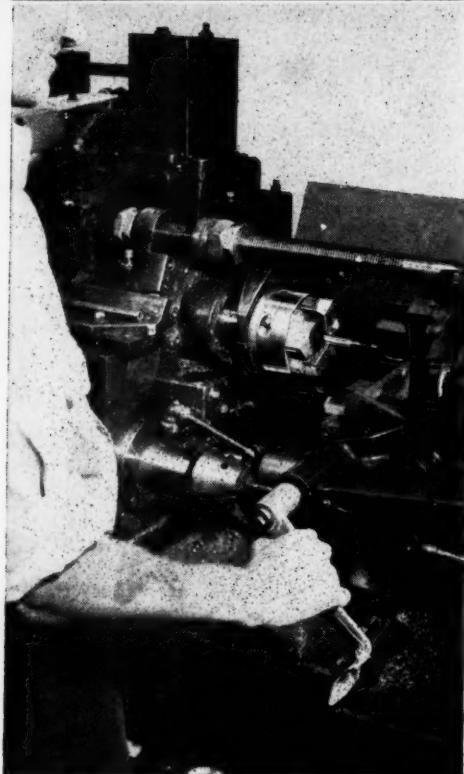
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Member



Thread Cost— $\frac{2}{10}$ ¢ Per Piece



LANDEX HEAD THREADS 300 PIECES PER HOUR AT LOW TOOL COST !!!

These operations illustrate a case history of the economy and efficiency of the LANDEX Head, designed for cutting precision threads at high production rates on automatic screw machines and other "live" spindle equipment.

In this instance, $\frac{1}{2}$ " American Standard Pipe Threads are being generated on sprinkler frames cast of red brass. The threads are cut into a relief $3/32$ " wide.

The wisdom of the tool engineer in selecting LANDEX Heads for performing these threading operations is borne out by information secured from the cost sheets. Production consistently averages 300 pieces per hour, floor-to-floor time, at a total threading cost of two-tenths of a cent per piece. Tool cost was held to a minimum with 5,000 pieces being threaded between chaser grinds.

This is just one example of many successful applications of the LANDEX Head to jobs requiring high-speed thread production at an economical cost. For additional information, write for Bulletin F-90.



LANDIS
Machine
COMPANY

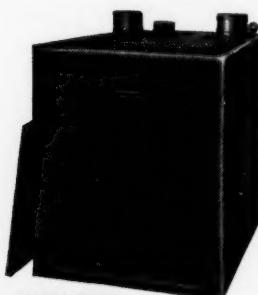
WAYNESBORO • PENNSYLVANIA

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

THE costliest cutting tool IN YOUR PLANT—



CYCLONE TYPE
for tool and gen-
eral grinding,
polishing, wood-
working, plastics,
glass, ceramics,
etc.



FILTER TYPE
for grinders,
drills, lathes,
surface grind-
ers, etc.



No — it's not a tool of production — it's a tool
of destruction! . . . it is **ABRASIVE GRIT** —
by-product of your grinding, cutting and fin-
ishing equipment.

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A MUST FOR DUST!

These units trap dangerous dust before it
can harm the health and efficiency of your
employees and damage valuable machinery
... These two distinct types of Duskolectors
offer the best and most economical solutions
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dust menace . . . Write today for bulletin.

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INC.

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Hammond OF KALAMAZOO GOOD MACHINERY SINCE '82

"See us at Booth 1150—National Metal Exposition"

EXTRA STRENGTH in the palm of your hand!

WILLIAMS CARBON STEEL WRENCHES



AVAILABLE INDIVIDUALLY AND IN SETS.
Catalog 301 shows the broadest line of its kind. Describes and Details: Engineer's Wrenches, Check Nut "thin" Wrenches, Hex-Box Wrenches, Square Box Wrenches, Tool Post Wrenches, Structural Wrenches, Construction Wrenches, "S" or Car Wrenches. Face, Pin, Hook, Adjustable-face, Adjustable-Hook Spanners, Socket Wrenches, and Adjustable Wrenches.

These wrenches stand up on tough jobs long after ordinary wrenches have to be scrapped.

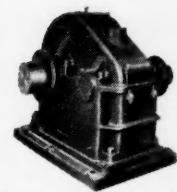
That's because they are scientifically designed and drop-forged from improved quality carbon steel and then heat-treated for additional strength to Williams exacting specifications. Openings are milled or broached, surfaces and edges smooth, sizes stamped on heads, black enameled (baked on)... heads polished bright.

When you work with a Williams wrench, you'll recognize its quality and utility at once. When you consider there are nearly 1000 sizes in a wide range of patterns, you can be sure of the right one for the job.

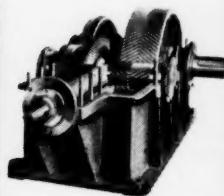
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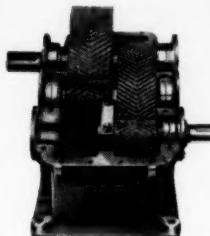
Be Wise... Buy
WILLIAMS
INDUSTRIAL TOOLS



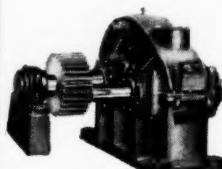
Heavy duty single reduction unit.



Horizontal right angle unit.



Standard double reduction unit.



Unit with pinion on extended shaft.



Close-up of a way of life for Speed Reducers

Long, trouble-free speed reducer life is vitally dependent on precision generation of the gears.

The gears of Farrel® speed reducers are made by the famous Farrel-Sykes method — a process that assures accuracy of tooth spacing, profile and helix angle. The herringbone design provides evenly distributed pressure over each tooth, from tip to working depth line. This means that there is no tendency for the teeth to wear unevenly and thus shorten the life of the gears.

Farrel speed reducers are made in a number of types, with a wide range of ratios and capacities. For further details, send for a copy of bulletin 449.

FARREL-BIRMINGHAM COMPANY, INC. ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Akron,
Detroit, Chicago, Memphis, Minneapolis, Portland (Oregon),
Los Angeles, Salt Lake City, Tulsa, Houston, New Orleans

FB-860



"Buffalo"
No. 18 Pedestal
Model Drill with foot
feed. Operator has both
hands free.

BUFFALO FORGE COMPANY

388 BROADWAY

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING

PUNCHING

SHEARING

CUTTING

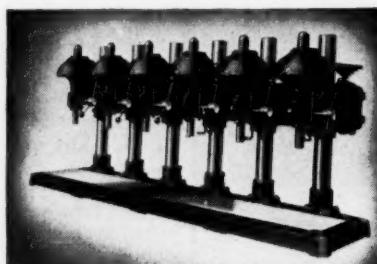
BENDING

For a Boost in Your
METALWORKING Output

"Buffalo" NO. 18
DRILLS

Here are drilling machines your operators can handle with minimum fatigue while setting records in drilling and tapping! All feed controls are easy to reach and handle. All setup adjustments can be made by convenient cranks. Best of all, these rugged production drills have precision-machined spindles running smooth and true on ball bearings for dependable accuracy. And "Buffalo" No. 18 Drills are available in 12 different models to fit into your setup to best advantage. WRITE FOR BULLETIN 3123 FOR THE DETAILS!

NOTE: "Buffalo" also builds a full line of Drills, Shears, Punches, Bending Rolls and Universal Iron Workers to put extra speed and profit into your metalworking. Write us about your problem!



"Buffalo" No. 18 Drills are available
in as many as 6 spindles for opera-
tion with several setups on a produc-
tion line.

MACHINE TOOLS

do you have
OIL SEAL TROUBLES?



SUPERFINISH can solve them!

Here's a typical case where a shaft with ground surfaces was driven at a speed of 1750 r.p.m. The oil seals created enough heat to burn the shaft and stop the motor. To make matters worse, it was found that twice the original speed was necessary. So, the oil seal surfaces were *Superfinished*, and the shaft operated at a speed of 3500 r.p.m. With the *Superfinished* surfaces, no heat was developed at this higher speed. No further trouble was encountered.

Superfinishing is a quick, simple and inexpensive process. Oil seal surfaces are but one of the many applications where it can save you money. Not only can it eliminate trouble, but often it can help you reduce manufacturing costs. Gisholt engineers can advise you regarding its applications.

Write now for the booklet
"Wear and Surface Finish."

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



Superfinished ▶



◀ **Superfinished**

GISHOLT
MACHINE COMPANY

Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



There's



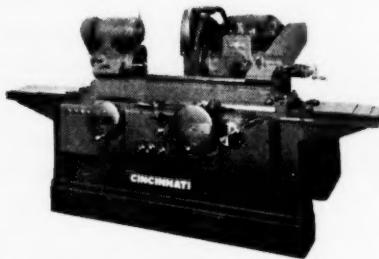
You can reduce the cost of a variety of grinding operations, like the one shown above, by replacing old equipment with new CINCINNATI FILMATIC Plain Hydraulic Grinders.



No Time Like the Present

To Replace Your Worn-Out Plain Grinders

Proper timing spells success in farming, driving a golf ball, making an investment. Proper timing in replacing shop equipment is whenever your replacement program indicates that old machines or methods should be discarded. ¶ In the field of precision center-type grinding, machines that no longer earn their keep should be replaced now, and your best replacement bet is CINCINNATI FILMATICs. For example, consider the medium-sized group, 6", 10"-L, 10" and 14"-L. There are many reasons why these machines should be your first choice:



CINCINNATI FILMATIC No. 10"-L Plain Hydraulic Grinding Machine. Catalogs No. G-566-2 and No. G-603 contain complete data on the medium-sized group. Write for copies.

CINCINNATI

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

October, 1953

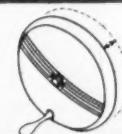
a. Grinding wheel spindle bearings are FILMATICs. They are dependable . . . require no adjustment, and run for years without attention.



b. Accurate table reversal within .004"; for safely grinding close to shoulders.



c. Two-speed manual table and cross traverse; for convenience in setting up the machine.



d. Single START-STOP lever for coolant flow, headstock spindle rotation and table traverse; reduces operating fatigue.



These are but a few of the many advantages offered by CINCINNATI FILMATIC Plain Hydraulic Grinding Machines. Compare them with your old plain grinders and you'll see why it will pay you to replace now. Complete data in catalogs No. G-566-2 and No. G-603, or look in Sweet's Machine Tool Catalog.

**CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO**

(Subsidiary of The Cincinnati Milling Machine Co.)



*Eliminate
Work Transfers!
Cut Set-up Time
In Half!*

**NO.
50 FOR**

**VERTICAL MILLING
& PRECISION BORING**

More production — faster — with less labor and lower cost! This accurate, versatile and rugged solid-base No. 50 is now doing the work of 2 or more machines in hundreds of busy plants!

The No. 50 incorporates every essential feature for handling an extremely wide range of difficult boring and vertical milling jobs with production-line speed and toolroom precision. Time-wasting work transfers are completely eliminated — set-up time is reduced to half or less!

Table Travel—Longitudinal	28"	Cross	18"
Vertical Capacity	.....	.....	28"
Number of Table Feeds—Dial Type	.....	.....	16
Table Feeds—Inches Per Minute	5/16" to 20"	.....	.....
Table Rapid Traverse—Both directions	.....	.....	100"
Horsepower	7 1/2	.....	.....
Weight	8100 lbs.	.....	.....

ATTACH TO COMPANY LETTERHEAD

W. B. KNIGHT MACHINERY CO.
3922 W. Pine Blvd., St. Louis 8, Mo.

Send details on No. 50 and other Knight milling machines.

NAME.....

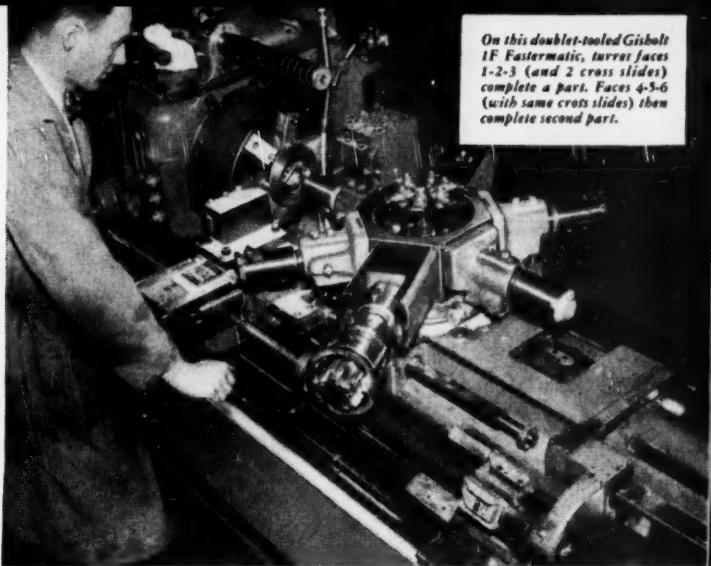
TITLE.....

Send information on Knight 20" and 42"
Power-Feed Rotary Tables

← *Mail Coupon For Details*

W. B. KNIGHT MACHINERY CO.
3922 WEST PINE BOULEVARD • ST. LOUIS 8, MISSOURI

HOW
DUPLICATE
TOOLING...
AND A
FASTERMATIC...



doubled production!

The time *and unit cost* for machining these cast iron pulley flanges were cut in half when the Fastermatic with double tooling took over the job.

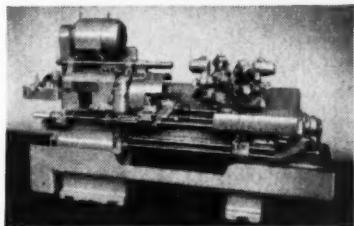
Just three turret faces were needed to complete the machining and threading on each part. Therefore, tooling is repeated on the other three turret faces so that *two* parts are finished with each revolution of the turret. Production is doubled over the old method . . . time lag is cut to a minimum . . . there's twice the time between tool changes.

This smart setup illustrates one of the many ways Fastermatic Automatic Turret Lathes give you greater efficiency and lower costs on a broad range of jobs. And one operator can usually handle two or more machines. Ask for the facts.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin



Floor-to-floor time for these pulley flanges is down to 1.75 minutes. Duplicate tools and collapsing taps on the turret rough and finish the bore, chamfer and cut threads. Front and rear slides shave the angle and form the radius on the O.D.

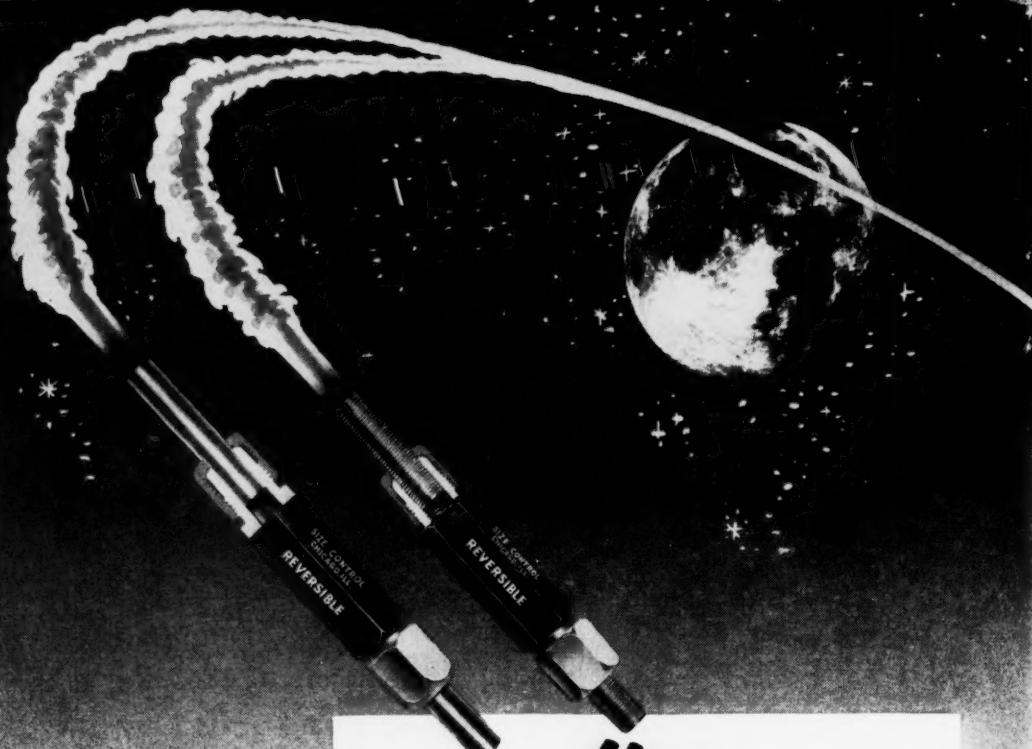


Gisholt 1F Fastermatic Automatic Turret Lathe



THE GISHOLT ROUND TABLE
represents the collective
experience of specialists in the
machining, surface-finishing
and balancing of round and
partly round parts. Your
problems are welcomed here.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



Use
SIZE CONTROL
REVERSIBLE
PLUG GAGES

FOR FAST, ACCURATE GAGING AT LOWEST COST...

...our catalog 53 tells you how!

SIZE CONTROL COMPANY

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Division of **AMERICAN GAGE and MACHINE COMPANY**

SIMPSON ELECTRIC COMPANY

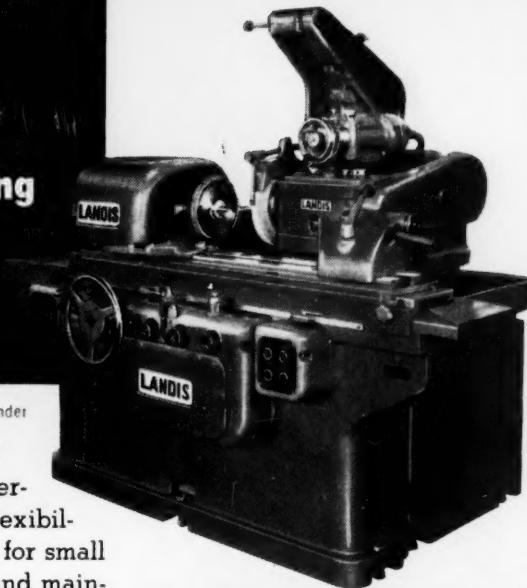
SIZE CONTROL COMPANY

WALSH PRESS & DIE COMPANY

**Quick Change
of Set-up Makes
Small Lot Grinding
Profitable**

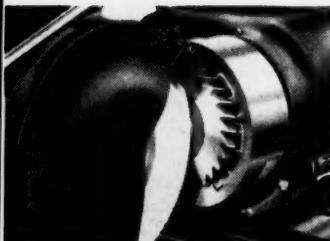
Landis 10" x 24" Type CH Universal Grinder

Modern operating features of Landis Universal Grinders permit quick set-ups. This gives flexibility and economy of operation for small lot manufacturing, toolroom and maintenance work. Write for Catalogs. Landis Tool Company, Waynesboro, Pa.

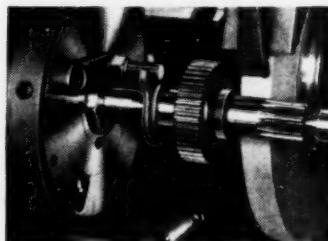


LANDIS
precision grinders

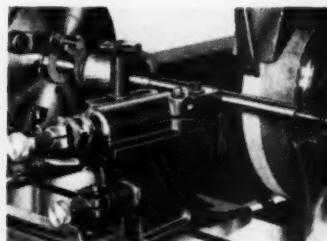
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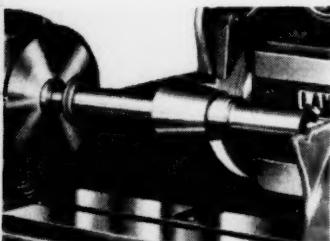
FACE GRINDING — Low headstock lets operator see grinding operation.



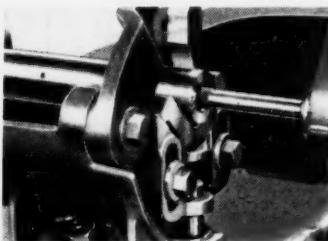
INFEED GRINDING — Microsphere wheel spindle bearings reduce sparkout time.



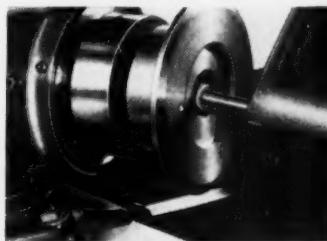
TRaverse GRINDING — Reduce traverse grinding time with automatic feed.



TAPER GRINDING — This piece has taper of 14° included angle.



INTERNAL GRINDING — Ready-to-use fixture swings into grinding position.



INTERNAL TAPER GRINDING — Headstock graduated for setting-up taper grinding jobs.



3 way control is "EXTRA" in
Jarvis

CONTROL 1
 is in production—
 constant improvements
 in methods and procedures
 make Jarvis Power Tools the finest that can
 be produced.

CONTROL 2 is in distribution—Jarvis field men
 are trained specialists—men who can
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 and follow-through.

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THE CHARLES L. JARVIS CO.
 MIDDLETOWN IN CONNECTICUT

**TUNGSTEN
 CARBIDE
 TOOLS**

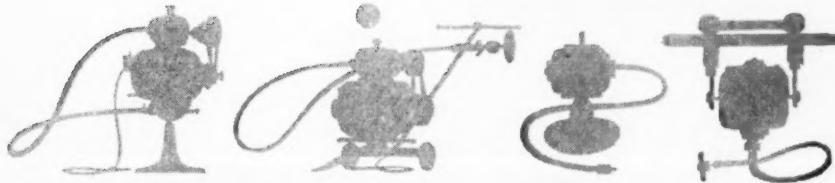
**Ground-from-the-
 solid**

Send for FREE catalog.

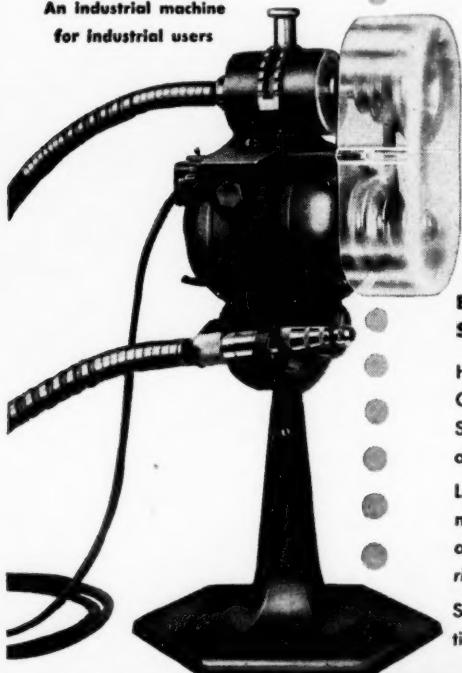
JARVIS POWER TOOLS

TAPPING ATTACHMENTS
 TAPS • FLEXIBLE SHAFTS
 AND MACHINES • ROTARY
 FILES • TUNGSTEN CARBIDE
 REAMERS AND MILLS
 DRILLS • BORING BITS

VERSATILE PERFORMERS



An Industrial machine
for Industrial users



Jarvis POWERFUL FLEXIBLE SHAFT MACHINES

BENCH, FLOOR, OR OVERHEAD SUSPENDED MODELS

Here are truly versatile machines that will do your GRINDING, CUTTING, BUFFING, DISC and DRUM SANDING, WIRE BRUSHING, and ROTARY FILEING operations — Faster and More Economically.

Let a Jarvis representative aid in analyzing your needs. This service is available without cost and assures you of getting the right machine in the right place at the right time.

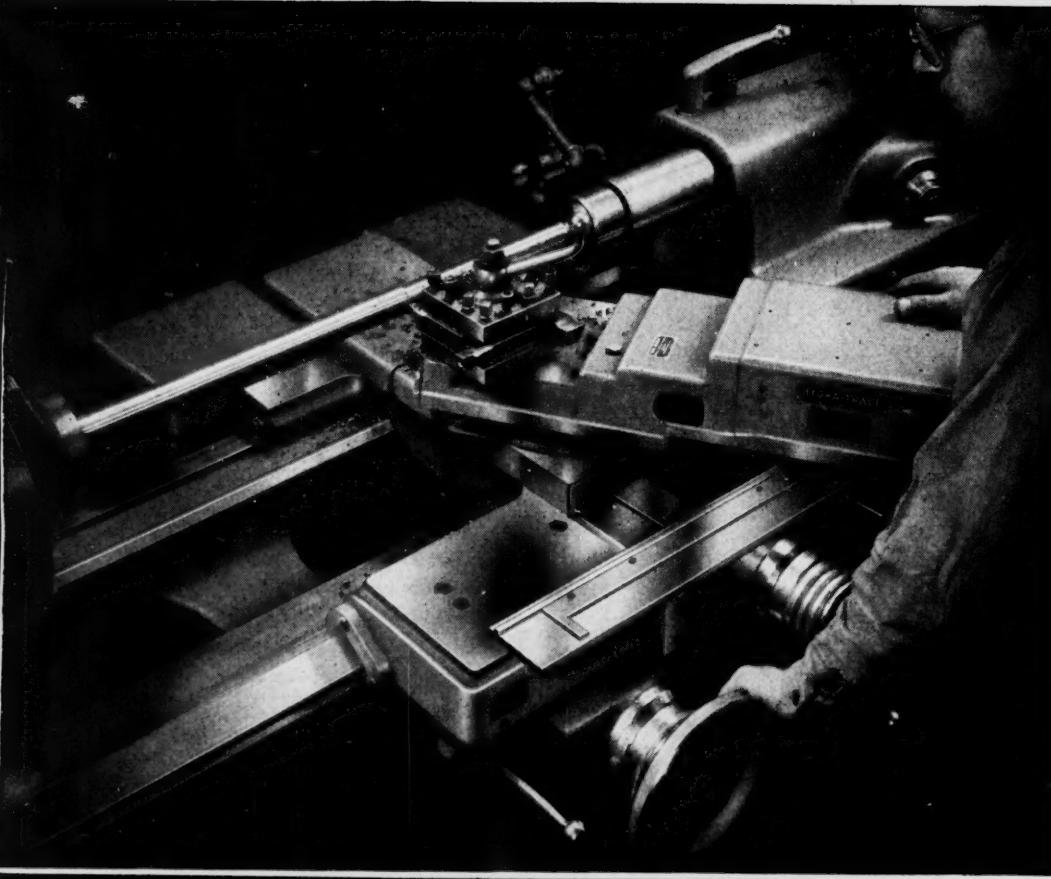
Send for our complete catalog containing illustrations and specifications of various models.

JARVIS
POWER TOOLS
TAPPING ATTACHMENTS • TAPS • FLEXIBLE
SHAFTS AND MACHINES • ROTARY FILES •
TUNGSTEN CARBIDE REAMERS • MILLS •
DRILLS • BORING BITS

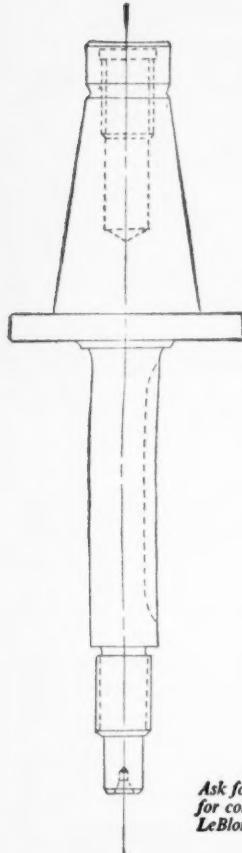
THE
CHARLES L. JARVIS CO.
MIDDLETOWN IN CONNECTICUT

NOW SCULLY-JONES TURNS

four arbors instead of 3...



same time, same lathe... plus "Hydra-trace"*



When defense needs mushroomed demand for production equipment, Scully-Jones & Co. of Chicago found itself jammed with orders for milling machine arbors (they make more arbors than anyone else). Acting on advice from engineers at LeBlond's Chicago Office, Scully-Jones added Hydra-Trace to their LeBlond 16" RT Engine Lathe. Now they turn out four arbors in the time formerly needed to produce three—same lathe, plus Hydra-Trace.

Besides boosting output, this template-controlled hydraulic tracer saves 45% on set-up time, gives uniform precision without the need of a highly-skilled operator.

Stepless form-turning, contour facing, and turning step shafts are all in a day's work for Hydra-Trace. *Fits all LeBlond Engine Lathes built since 1935*, can be mounted easily in a matter of minutes. Templates are flat, compact, suitable for both rough and finish turning. They can be produced readily in your own plant, stored in limited space.

When turning requirements call for increased output—with present machines or with new equipment—you'll find just what you need in LeBlond's complete line of lathes and lathe attachments.

Call your nearby LeBlond Distributor or write—

Ask for Bulletin HT2E
for complete details on
LeBlond Hydra-Trace.

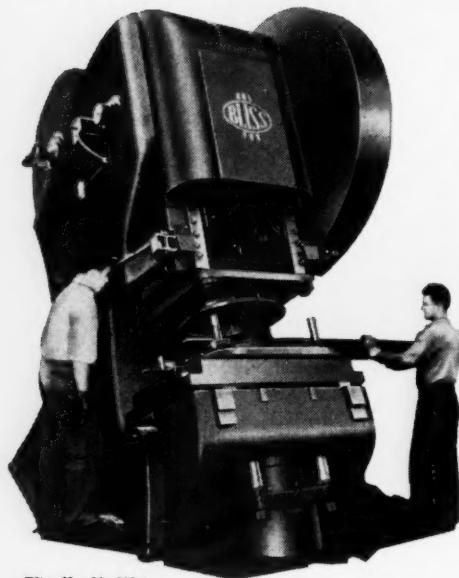
turned faster by



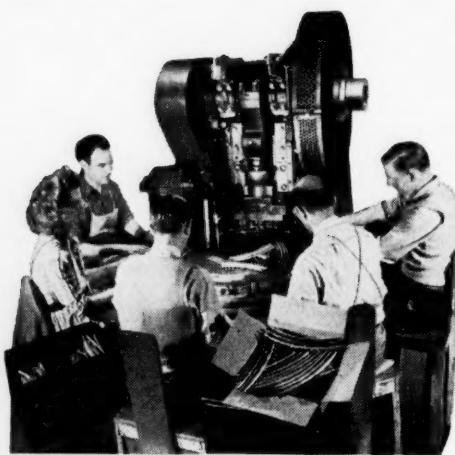
THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 65 YEARS

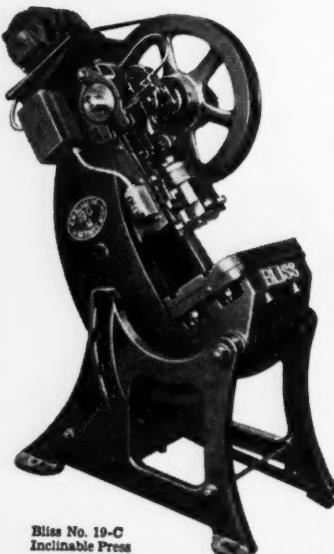
9 reasons why Bliss Inclinable



Bliss No. 30, 200-ton
Enclosed Inclinable Press



Rails and ties for Lionel electric toy trains are assembled at the rate of 1250 per hour in this Bliss No. 21 Inclinable Press with 48", 8-Station Bliss dial feed and a staking die.



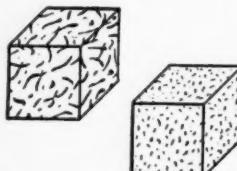
Bliss No. 19-C
Inclinable Press

You have only to look "inside" a Bliss Inclinable Press to see where it gets its *ruggedness* and almost indestructible *precision*. Why it delivers consistent, uninterrupted performance over the entire range of press operations from blanking to drawing. Why it's the most-specified inclinable press among stamping shops and fabricators, with over 50,000 in use throughout industry.

Let's take a Bliss Inclinable apart pictorially and examine the physical reasons for its ruggedness and precision...whether it be a 10-ton or 200-ton press out of Bliss' range of standard sizes.

1

FRAME



Strong and durable press frames of high tensile Meehanite castings are produced under rigidly controlled foundry practices. These three-dimensional drawings show the distribution of graphite in ordinary cast-iron (left) as compared with controlled graphite structure of Meehanite casting (right) used in Bliss presses.

2

CLUTCH



Often described as the finest positive clutch available on any press, Bliss patented Rolling Key Clutch is standard feature of Bliss Inclinables up to 5 1/2" shaft. Note location of clutch keys near shaft center. This means slower-moving points of engagement, faster operating speeds, less shock during intermittent operation and longer life to all moving parts. Bliss Inclinables can also be equipped with air-operated friction clutch, which is standard for presses of 6" shaft diameter or larger.

Presses outsell all other makes

3 CONNECTIONS

Another feature is solid, plug-clamp connection strap, which gives full 360° bearing against slide adjusting screw. This arrangement also permits using V-thread on screw, making replacement easy.



4 SLIDE ASSEMBLY



Slides are accurately gibbed to insure precise registry of die and punch. Ball seat is renewable, as are split bronze ball-cap bushings and laminated shim against which ball-cap is brought down by four bolts to give correct clearance for proper lubrication and fit. All parts are machined to close tolerances for interchangeability. For a fraction of the cost of a new slide, you can recondition the ball seat bearing.

5 BEARINGS, WAYS AND GIBS

Main shaft bearings and connection bearings are bronze bushed. Roller Bearings are standard for drive shaft bearings on large geared presses. All wearing surfaces are especially finished to insure long life.

6 CUSHIONS

Every Bliss Inclinable Press is designed to accommodate Bliss Marquette die cushions which extend the press application to drawing operations on medium gauge metal.

Many Bliss cushions are supplied for presses that have been in use for years. Placing the responsibility for efficient press and cushion operation with Bliss assures you of the utmost in satisfactory performance.

7 LUBRICATION

Bliss Inclinables have floor-line lubrication systems with oil or grease fittings at main points of moving contact. All standard Bliss Inclinable frames are machined to take Bjur one-shot pressure system.



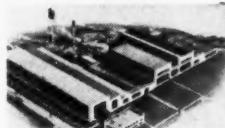
8 FEEDS



Bliss Inclinable Presses are designed to take any type of Bliss automatic or semi-automatic feed. Addition of a few extra parts to the regular constant tension brake will convert it to an automatic releasing brake for continuous operation with roll, dial or magazine feeds. Every Bliss feed is engineered to specific requirements yet a large variety of standard designs is available. A Bliss feed on a Bliss press means the finest equipment that money can buy, plus a single responsibility for efficient performance of entire unit.

9 SERVICE

All replacement parts and service orders carry top priority at Bliss to reduce your press "down time." Supplying service parts for presses more than 50 years old is routine at Bliss. Accurate-fitting parts are supplied from stock by virtue of precision manufacturing methods which guarantee interchangeability. A large sales and service organization is available. Incidentally, one effective way of preventing costly shutdowns is to call for a Bliss service inspection of your Bliss presses. A highly competent maintenance man will call on you and the chances are that he will spot trouble before it happens.



The Bliss plant at Hastings, Michigan is specially equipped for quantity production of parts for Inclinable Presses.

These are the reasons—plus the fact that *they are priced right*—that are most often reported by the trade for its preference of Bliss presses.

If your pressed-metal production calls for inclinable presses, you're sure to find the specific answer among Bliss' standard sizes. And a Bliss sales engineer will be on hand to give you unbiased counsel. Remember too, "BLISS" on your press is more than a name...it's a guarantee!

Write today for catalog 2-C illustrating the new Bliss Inclinable Presses and Service Sheet A-110 giving operating and maintenance instructions for the complete line.

E. W. BLISS COMPANY, CANTON, OHIO

E. W. Bliss (England) Ltd., Derby, England

E. W. Bliss Company (Paris), St. Ouen sur Seine, France

U. S. Plants in Canton, Salem and Toledo, Ohio; and Hastings, Michigan. Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo, and Toronto, Canada. West Coast Representatives: Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Company, Seattle. Other dealers in United States cities and throughout the world.

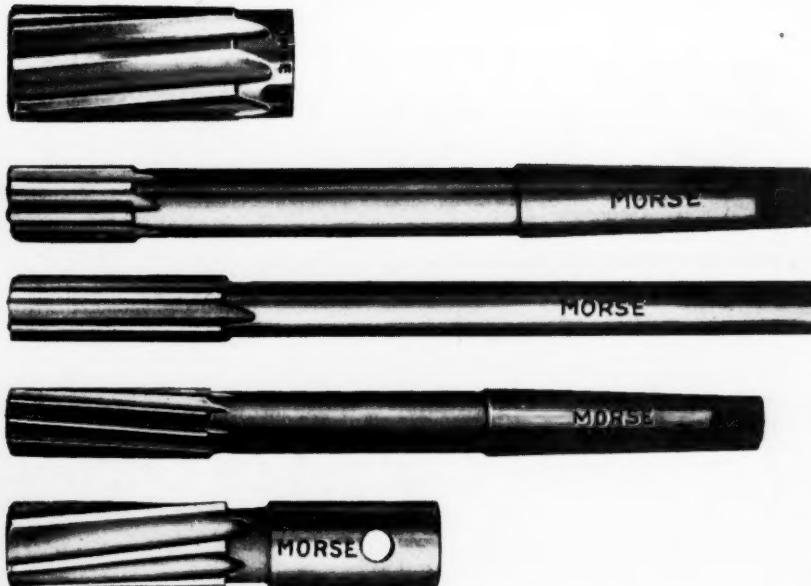
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BLISS

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MORSE



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Staggered flute-spacing is the payoff feature of Morse Reamers. It ends biting, slipping . . . gives you smooth cutting and *accurate hole-sizing every time*. Chips are cleared freely, with no galling or scoring of the surface.

Morse makes all types of Reamers, for ferrous and non-ferrous . . . including the Morse Expanding Chucking Reamer which can be reground again and again . . . and even including the huge tools used in bridge and structural work. What's more, you can get Morse Reamers

Electrolyzed for extra life, if you wish.

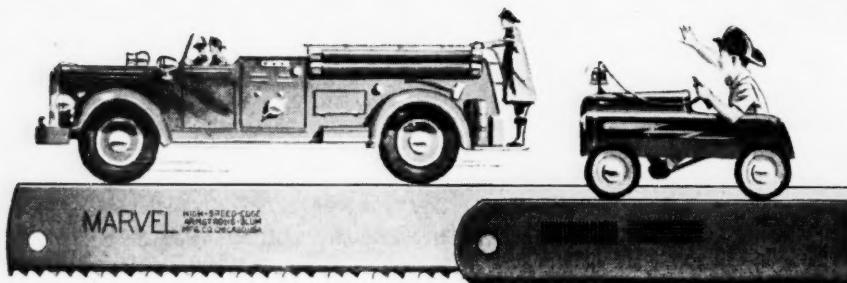
Talk it over with your Morse-Franchised Distributor . . . he's got the know-how and the stock to start you toward better work and greater savings than you ever expected from this type of cutting tool. *Call him today.* He'll give you your first saving (in time) right now.

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Cutting Tools

*Buy them by phone
from your Morse-Franchised
Distributor and save
ordering time*



...but

Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate—without the "know-how" of MARVEL EXPERIENCE . . .

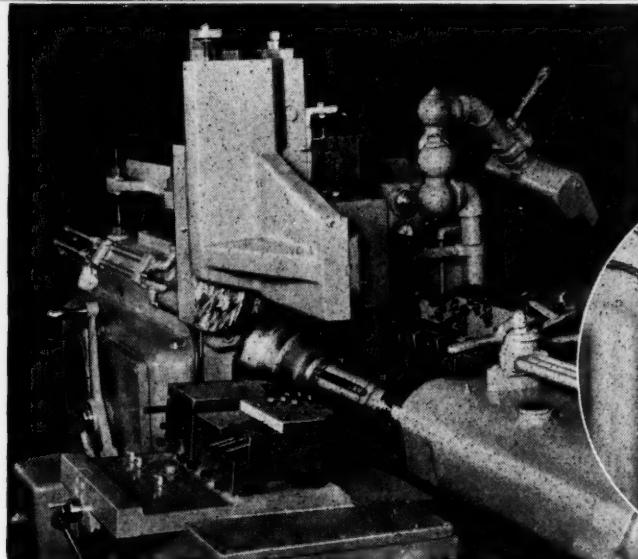
Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be **SAFE**, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!



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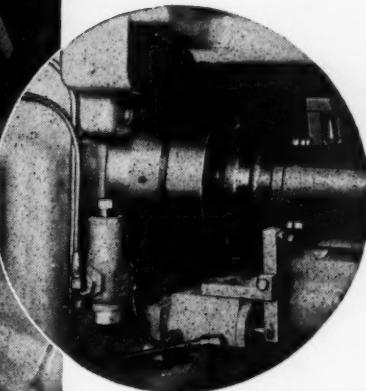
MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

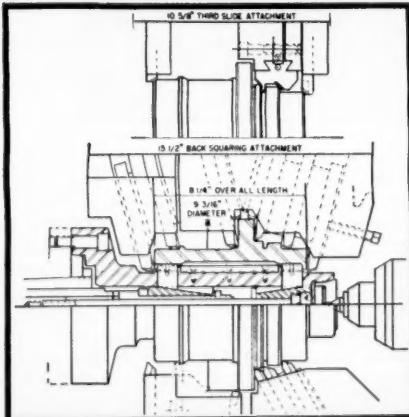


Close-up view of machine
showing details of Driving
Arbor

Close-up view showing
Air-operated Locator



PRODUCTION SPEEDED ON DRIVE GEAR HUBS WITH MODEL "AR" AUTOMATIC Lo-swing LATHE



Problem: To automatically turn, face and chamfer shoulders, and cut groove on Gear Hub with 9" Flange diameter, locating and centering from bottom of spline previously machined.

Solution: The Model "AR" Automatic Lo-swing Lathe was selected for this job due to its rigid construction and its demonstrated fine performance with cemented carbide tools.

The expanding, air-operated driver, shown in the line drawing and the main illustration, is fitted with two sets of six driving jaws which accurately center the part true with the bottom of the splines. The jaws are actuated with two independently-expanding bushings and pull bars which equalize the pressure on both sets of jaws. The parts are located longitudinally on the arbor by an automatic, air-operated locator, which moves forward to the exact locating position when the tailstock spindle is withdrawn and relieves when the spindle is advanced.

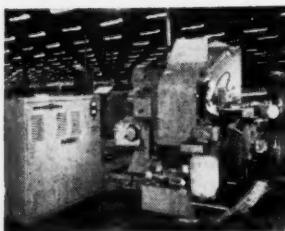
All diameters are turned with the tooling mounted on the front carriage slide. The squaring, chamfering and grooving operations are divided between the rear and vertical slides in order to simplify the tooling which is used for several different sizes of hubs. The line drawing shows the tooling in detail.

Consult our Engineering Department for Automatic Lo-swing Lathes engineered for your particular turning problems.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

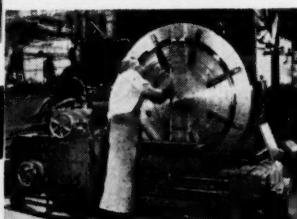
PRODUCTION COSTS ARE LOWER WITH Lo-swing

Manufacturers Report on **T** Lathes*

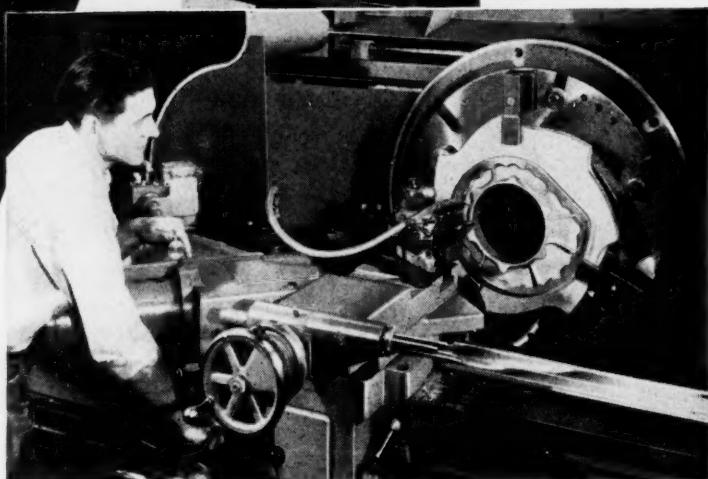


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World leaders in production have installed, tested and production-proved Lodge & Shipley T Lathes.

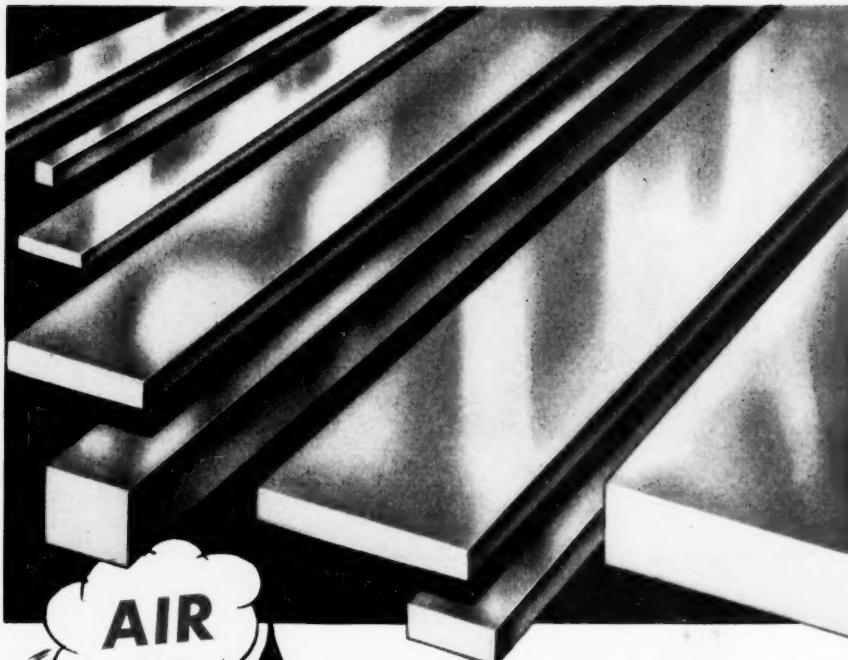
T Lathes are designed specifically for thin-wall, short length and large diameter work that characterizes jet engine and other production. These lathes have solved the problem of straight and contour facing, turning and boring parts formerly machined on over-size, over-costly, over-clumsy

conventional lathes and boring mills. Far faster, more sensitive and accessible, they save cost, time, floor space and assure required accuracy. Whatever your requirements or production, there is a T Lathe to cut time and costs on large diameter, short length parts machining. With priority assistance, you may be able now to obtain good delivery. Write for new literature #215 and complete details.

THE **Lodge & Shipley** COMPANY

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CINCINNATI 25, OHIO



AIR
or
OIL HARDENING?...
which DIE STEEL is best for you?

For punches and dies that produce up to 50% more pieces per sharpening — use Simonds Air Hardening Die Steel. 5% chrome content makes this non-deforming steel more wear-resistant. Better for punching or cutting silicon or stainless steels, Monel metal, or other abrasive metal. Spheroidize annealed for good machinability, it also has a wide hardening range (1450° to 1540°F). Stock sizes from $\frac{1}{2}$ " to 2" thick, and 2" to 10" wide in 36" lengths.

For standard die, jig, punch, gage and small tool applications, Simonds Oil Hardening Flat Ground Die Steel is a valuable time and money saver. Made of non-deforming molyb-

denum type die steel, it is uniformly annealed for easy machining and uniform hardening. Due to its wide hardening range (1450° to 1540°F) good results are assured with even the simplest heat treating equipment. Stock sizes available from $1/64$ " to 3" thick and $1/4$ " to 14" wide in 18" lengths. Heavier sizes also furnished in 36" lengths.

Your Simonds Distributor stocks many sizes of both types . . . individually packaged with simple heat treating instructions. Call him for complete details.

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job done

with
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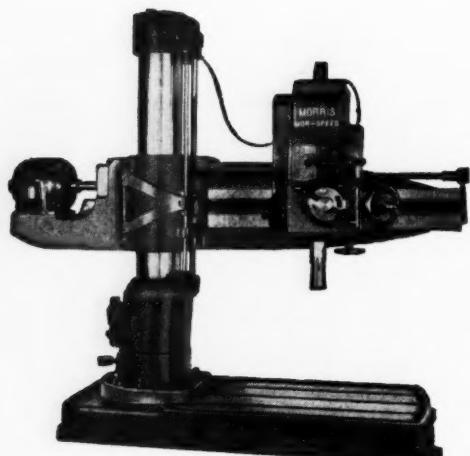
with completely centralized controls . . . instant selection of proper speed, feed; easily set automatic stops and trips.

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alloy steels . . . modern hardening . . . extra anti-friction bearings, all assure minimum wear and low cost service.



9" Column Standard and Heavy Duty Models (with 3 and 4-foot arms)

11" Column Heavy Duty Model (with 3, 4, 5 and 6-foot arms)

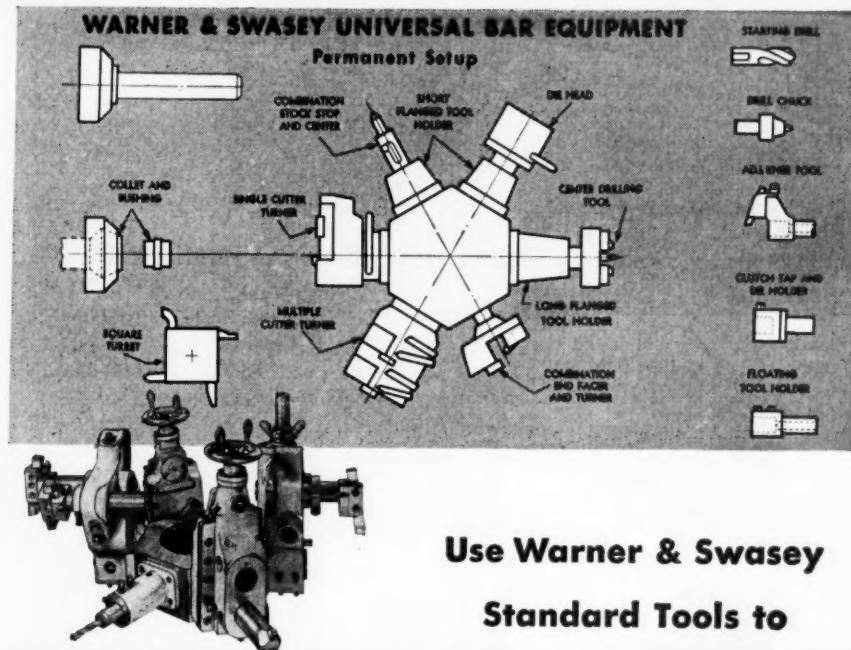
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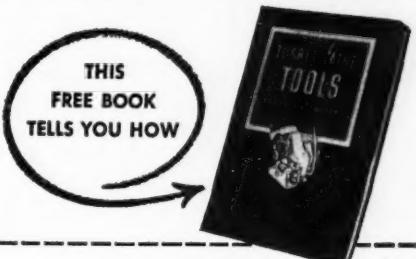
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YES, you can make Warner & Swasey standard turret lathe tools and Universal Tooling Sets pay off—with increased production, less setup, handling and cutting time, longer tool life. This free book clearly and simply explains how to select tools and improve setups, combined and multiple cuts, and many other modern tool applications. Fill in and mail the handy coupon for your free copy—today!



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Please send me my free copy of "Turret Lathe Tools" today!

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Position

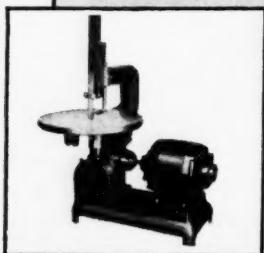
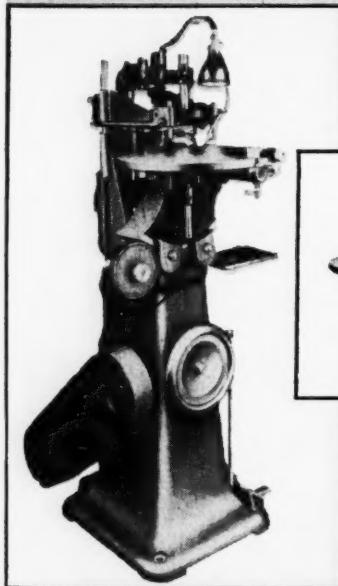
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Oliver's 40 years of experience proves without a doubt that it is quicker and cheaper to saw out a piece than to drill and chip it. Oliver Die Makers do all sawing, filing and lapping operations with ease, economy, and speed. Many Oliver Die Making Machines have been in continuous use for more than 25 years. Let Oliver of Adrian save dollars for you in making less-expensive dies, gauges, templates and cams.

OLIVER DIE MAKERS Available in 5 Models

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It takes only a **Jiffy**
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PADDED SHIPPING BAGS for complete packing protection.

Consider the savings effected in using JIFFY PADDED SHIPPING BAGS.

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Available in 8 standard sizes.

Free samples on request.

Distributors in 43 principal cities.

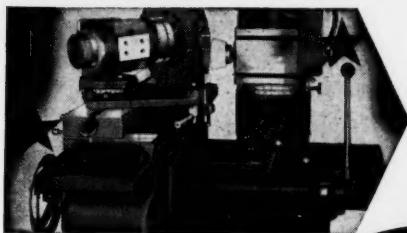
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Rear lever gives operator convenient right hand control. This feature, plus ball bearing table ways, reduces fatigue . . . saves time and effort . . . pleases operators.

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No. 12 sharpens all types of cutting tools. Readily adaptable to both internal and external grinding.

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**"Doing a job"
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30% decreased
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*"Since installation this Standard Tool Grinder
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Outstanding performance? No . . . just typical
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Available in 10" and 14" wheel sizes; wet or
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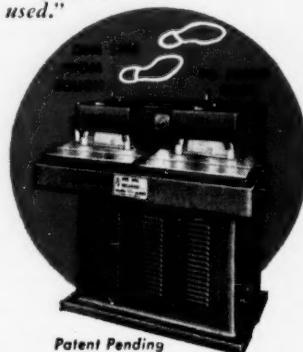
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Now you can make two bends at the same time in a piece already bent on different planes. The dies are adjustable to any centers within the height of the central die spindle. This feature also insures that both the top and bottom bends will be identical. The PEDRICK Benders are equipped with automatic relay controls for automatic duplicate production bending. Ideal for chair frames, cart handles, and a myriad of other applications.

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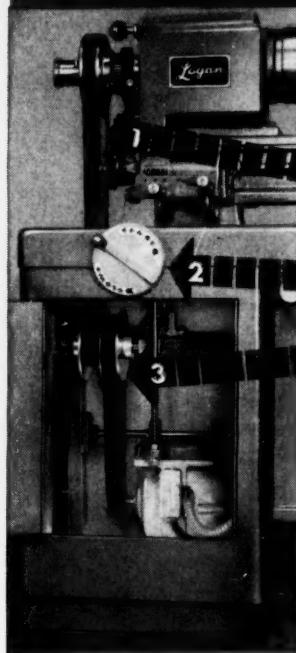
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ON... *Logan*
12" SWING LATHE
At No Extra Cost



Principal Variable Speed Drive Parts

- 1 Upper Section showing spindle V-Pulley and Vari-Speed belt.
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Belts are easily replaced. Spindle Speed Chart on gear guard clearly marks settings for various speeds.

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No. 2955-V
12" Swing Lathe with
Variable Speed Drive

Infinite Spindle Speeds, 38 to 1575 rpm

The rugged, accurate Logan 12" Lathe is now available with either standard V-belt Drive or Variable Speed Drive, *at the same economical price*. Where work requires a variety of spindle speeds, the Logan Variable Speed Drive changes speeds while the lathe is running, and definitely reduces costs. On large diameter facing, for example, optimum surface speed is maintained by simply turning the Speed Control Handle as the cutter goes into the work. No need to stop the lathe. No belt shifting. See *all* the features that make this versatile 12" Logan a profit building lathe.

Brief Specifications of Logan 12" Lathes

Swing over bed and saddle wings, 12" . . . Center distances, 23" and 35" . . . Turret Lathes Models have 43" bed length . . . 1½" spindle hole . . . 1" collet capacity . . . 16 standard V-belt drive spindle speeds, 35 to 1230 rpm . . . Variable Speed Drive Models, infinite spindle speeds from 38 to 1575 rpm.

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COST TOO MUCH?

LOOK AT THIS
COMPARISON
BETWEEN
WESSONMETAL
AND HIGH
SPEED STEEL



Your Higher Original Cost
RESULTS in LESS COST, MORE PROFIT

ONE P. S. STEEL PLATE

Cost per Square Foot.....\$1.00

Total Tool Cost.....\$1.00

Average Price.....\$1.00

Cost per Plate.....\$1.00

Cost per Job.....\$1.00

Actual Job

Caterpillar Tractor Co.

Part Name.....Cutting Edge Bulldozer Scraper Blade
Operation Description.....Form Edge Scraper Blade
Machine Model-Type.....Rockford Planer Series #4
Tool Type.....MX-7 Multicut Planer Holder
Planing Speed.....100 S.F.M.
Feed.....0.025
Depth of Cut.....0 to $\frac{1}{8}$ " Max.



WESSON METAL CORPORATION

LEXINGTON 34, KENTUCKY



TRACER LATHE
TOOL HOLDERS
(STYLE DTRL)

WESSON engineered especially for jet engine production and now widely used on other operations on "Follower" lathes. The DTRL Tool Holder cuts from right to left or left to right with 35° clearance on each side of cutting edge. Wessonmetal changeable 55° insert gives you 4 cutting edges. Band is replaceable at low cost.

Write for folder or call your Wesson Tool Engineer. He's a trained carbide expert.

See "THIS CARBIDE AGE"

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FOR HIGHER PRODUCTION

investigate... surface broaching
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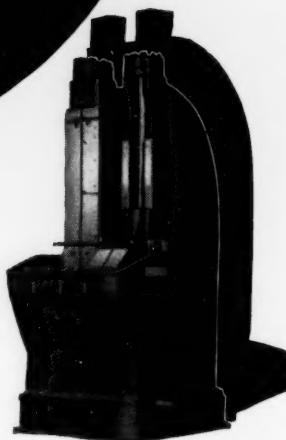
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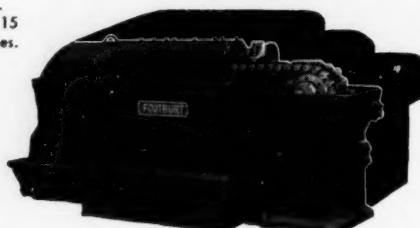
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Made in 5, 10, 15
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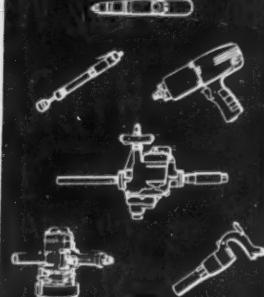
S U R F A C E B R O A C H I N G

Thor HAS THE ANSWERS!

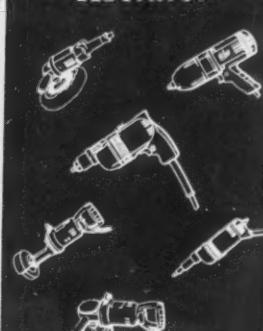
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With Portable Power Tools

60 years in the business, with over 1,500 different types of power tools available, **THOR POWER TOOL COMPANY** is well qualified to give you sound, impartial advice on *ALL* portable power tool problems.

Thor—and only Thor—specializes exclusively in the manufacture of portable power tools . . . of ALL types.

For money-saving, cost-cutting *IDEAS*, write for Thor Power Tool Catalogs or a "get acquainted" call from a Thor service engineer. Thor Power Tool Company, Aurora, Ill. Sales and Service Offices in Principal Cities



YOUR FILES ARE INCOMPLETE if you do not have the latest Thor Tool catalogs. Use coupon below.



Balancers	Hammers	Rammers	Sanders
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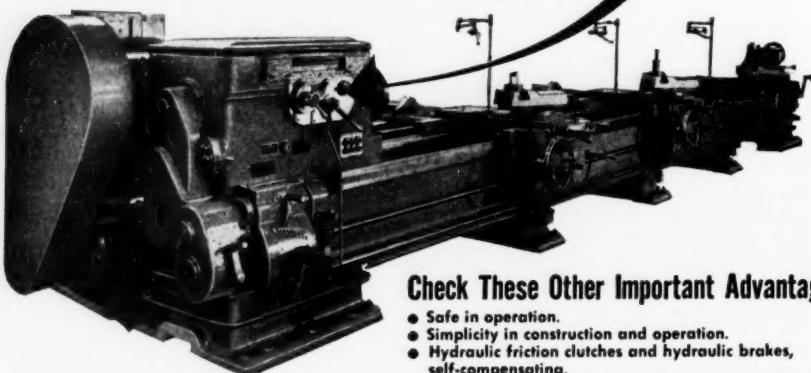
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Just a turn of the hand wheel on the front of the headstock of the LEHMANN Hydratrol Lathe gives you a speed change! An automatic slide rule, co-ordinated with the movement of the handle, shows spindle revolutions per minute and indicates a slide rule calculation of the cutting speeds in feet per minute.

Calculation by the operator is unnecessary. The rotary handle provides all speed changes for 16 forward and 8 reverse speeds. No need for intermediate stop; unnecessary to disengage the friction driving clutch to change speed.



Check These Other Important Advantages:

- Safe in operation.
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- Hydraulic friction clutches and hydraulic brakes, self-compensating.
- Automatic safety relay, for harmless and easy engagement of positive clutches when speeds are changed.
- Spindle release for chucking.
- Perfect, safety-control lubrication with filtered oil.
- Gears constantly in mesh.

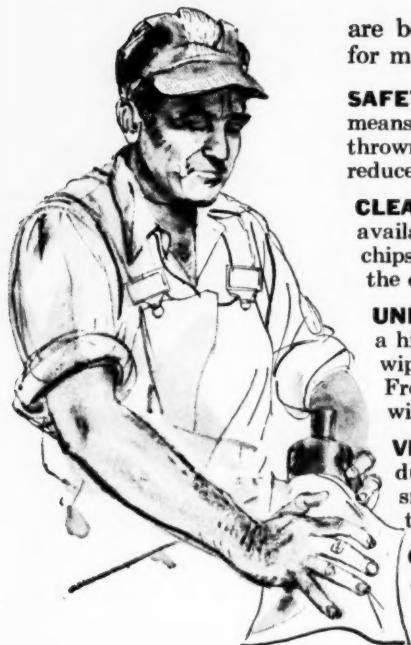
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LEHMANN MACHINE COMPANY

GRAND AT CHOUTEAU • ST. LOUIS 3, MO.
DIVISION OF NOVO ENGINE CO.

One demonstration, and key men agree

NEW Scott Industrial Wipers



are better than anything they've ever used for most industrial wiping jobs. Here's why:

SAFETY—Scott Wipers are disposable. This means that harmful filings, oils, and shavings are thrown away with the used wipers. Clean edges reduce chances of catching in moving machinery.

CLEANLINESS—Because a clean one is always available, you can be sure of a wiper free from chips and foreign matter, thus helping eliminate the carrying of dermatitis.

UNIFORMITY—Every inch of every wiper is a highly effective wiping surface . . . and each wiper is of standard size, color and absorbency. From experience you will soon know the exact wiping requirements of each job.

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Most plants have found a 90-day trial—with a Scott representative working hand in hand with their supervisory personnel—the most accurate way of measuring the advantages of Scott Industrial Wipers.



For further information, fill out coupon and mail to Scott Paper Co., Chester, Pa.

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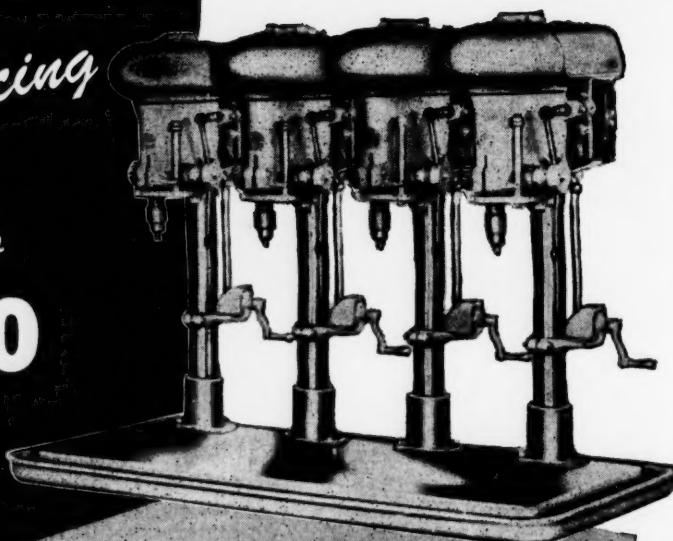
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Announcing

THE
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DURO
LINE



MULTI-SPINDLE DRILL PRESSES

Here's the latest addition to the expanding line of Duro high speed production drill presses. These new 15½" drill presses now enable you to make up your own drill press combinations in 1, 2, 3, or 4 spindle set-ups. Gives you a continuous production line, eliminates transferring between machines and provides maximum working surface on long, heavy work. Precision machined, accurate, each unit incorporates the most modern improvements and features for most economical operation and faster, cost-cutting production. The entire Duro line now includes 32 models in 3 sizes with a "just-right" drill press for every job.



Write for FREE Brochure

check-full of facts and figures on the complete line of Duro drill presses, detailed construction features, plus available attachments and accessories. Find out how you can adapt a DURO to your specific production set-up.

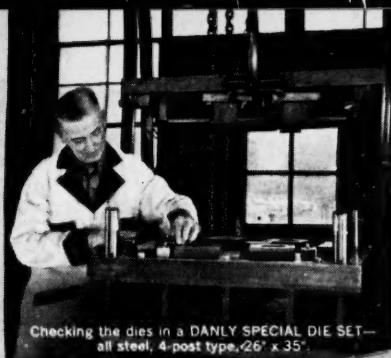
Here are a few features:

Ball bearing equipped; 0 to ½" chuck capacity; 4¾" spindle travel; 9 spindles; improved Jacobs "safe-lock" Chuck which prevents chuck from flying off spindle; simple quill tension adjustment and wear compensating adjustment; rigid 2¾" dia. steel column; double support motor mount; positive depth stop, adjustable depth gauge; built in switches for light and power; plus many other features.

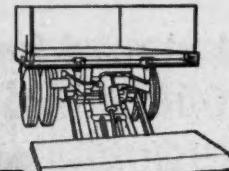
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WORLD'S LARGEST MANUFACTURERS OF POWER AND HAND TOOLS (DURO-CHROME)



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all steel, 4-post type, 26" x 35".



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LIFT GATE
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SHOWN IN LOADING POSITION



DANLY SPECIAL DIE SETS



View showing DANLY SPECIAL DIE SET during production run. Tail gate gussets are blanked and pierced in a single stage operation from 10 gage blue annealed sheet.

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For years now, the Anthony Company, makers of hydraulic lift gates for motor trucks, has relied on Danly Special Die Sets in their production operation. Based on long experience, they've found that Danly Special Die Sets cut their tooling costs and save time... because they provide the finest precision starting point for diemaking. Why not build your production dies in Danly Special Die Sets?... see what die performance can really mean.

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2100 South Laramie Avenue, Chicago 50, Illinois

**DANLY SPECIAL DIE SET SERVICE
IS FAST AND CONVENIENT—CALL
YOUR NEAREST DANLY BRANCH**

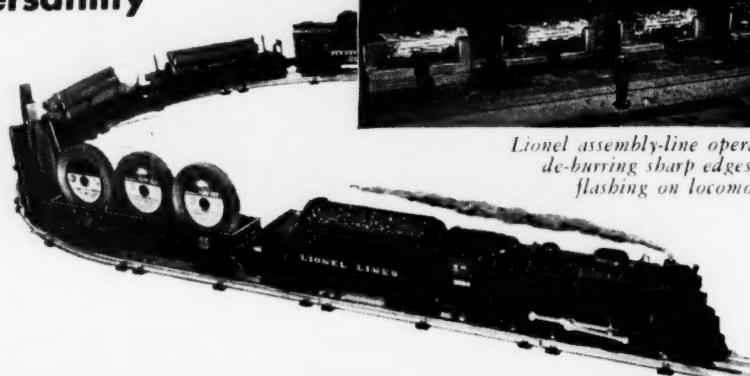


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Lionel assembly-line operation
de-burring sharp edges and
flashing on locomotive.

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Wish YOU were HERE? It's an odds-on bet you do, since most everybody goes for Lionel Trains!

See the newest—soon arriving in your nearby stores. See the superb

Brightboy de-burring work that makes the metal edges and surfaces smooth and safe to the impatient, far-from-gentle hands of enthusiastic junior railroaders!

You don't have to wish to put greater speed and quality into your finishing. The

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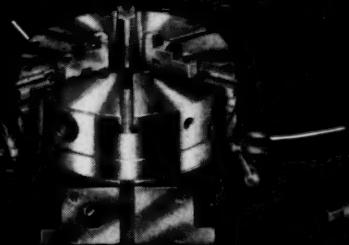


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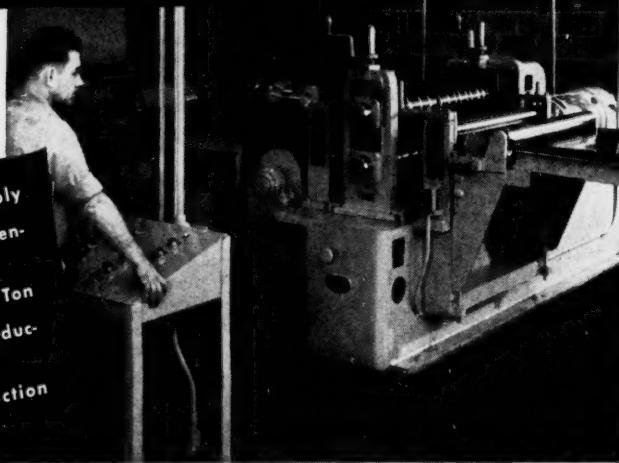


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THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.

YODER Multiple Rotary SLITTERS

- Easier Strip Supply
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- Lower Cost per Ton
- Simplified Production Planning
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IF YOU USE over 100 tons of coiled strip per month, in strands of different widths, you will find a Yoder slitter a most profitable production tool. In times when materials are scarce, it eases your strip supply because you can buy standard widths from a greater number of sources of supply, and at a substantial saving in cost per ton. This saving alone soon pays for your investment.

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Yoder makes a complete line of rotary slitters for sheets and coils, including coil boxes, uncoilers, recoilers, scrap choppers, coil handling cars, etc. Yoder slitter book is a treatise on the economics of doing your own slitting. Ask for it.

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Complete Production Lines

- * COLD-ROLL-FORMING and auxiliary machinery
- GANG SLITTING LINES for Coils and Sheets
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PORTABLE TOOLS FOR INDUSTRY



CHIPPERS



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VERTICAL SANDERS



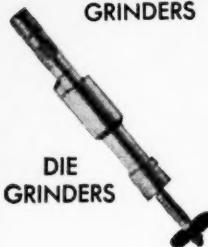
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RAMMERS



MIDGET GRINDERS



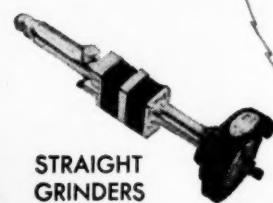
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AIR

THE ROTOR TOOL CO.

CLEVELAND, OHIO

HIGH CYCLE



THIS

MARK

on Collects & Pushers USED IN AUTOMOTIVE AUTOMATICS...



is your best insurance of

- positive gripping power

- ease of adjustment in use

- uniformity of heat treatment

- precision grinding and gauging

Some salesman may offer you a "trick design" in collets, another will claim his "just as good as." Or you may even hear "we make all these for National Acme." Don't fall for it.

The plain facts are these—GENUINE National Acme branded Collets and Pushers are made only by and are available only from the original builders of Acme-Gridley Multiple and Single Spindle Automatics—and for no other machines.

This Company assumes the same responsibility for the high performance of its Collets, Pushers and other stock feed components as it does for the machines to which they are engineered—more than 45,000 Acme-Gridleys in use.

If a Collet proving a better performance record could be found (we've looked at dozens of them) we would adopt it and it would proudly bear our brand name.



Fact is, every month a higher percentage of Acme-Gridley owners who have experimented are returning to their logical Collet source—convinced that nowhere else can they get so much for their Collet and Pusher dollar. So next time you order, remember—

Write for
Catalog CP-49A

Genuine
ACME-GRIDLEY COLLETS AND PUSHERS ARE MADE
ONLY BY AND ARE AVAILABLE ONLY FROM...

ACME-GRIDLEY COLLETS AND PUSHERS ARE MADE

ONLY BY AND ARE AVAILABLE ONLY FROM...

The NATIONAL ACME COMPANY

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Acme-Gridley Bar and Chucking Automatics, 1-4-6 and 8 Spindle
Hydraulic Thread Rolling Machines—Automatic Threading Dies
and Taps—Limit, Motor Starter and Control Station, Switches—
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**Minneapolis-Honeywell discovered
the way to change-over to ...**

RAHN

**BLACK
GRANITE
SURFACE
PLATES**

AT

No Cost

**THESE MEN AT
MINNEAPOLIS-HONEYWELL
CONCEIVED THE PLAN:**

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HOW**

THEY'RE DOING IT ...

"We decided to classify our surface plates as Class A, B or C, according to their condition of wear. Then, instead of rescraping plates as they become worn, we step-them-down to less accurate work. The money we've saved has paid for our installation of Rahn Black Granite Surface Plates."



Write
for literature
FREE TRIAL

You too will find it profitable!

DON'T SCRAPER worn surface plates

DON'T SCRAP them either ...

step-them-down for use on less accurate work. You'll save enough to replace with Rahn Granite Plates for precise work.

RAHN GRANITE SURFACE PLATE CO. 636 N. Western Av. Dayton 7, Ohio

"We standardized on SKIL Drills after testing 5 leading makes!"

says **Norman Bonomo, assistant superintendent,
B & G Manufacturing Co., Pittsburgh, Penna.**

"SKIL Drills were first in ease of handling, first in performance, first in low maintenance, and first choice of our employees," Norman Bonomo explains. "We make aluminum windows and doors for both commercial and private buildings and keep our power tools—especially drills—in constant hard use. Consequently, we ran extreme tests to determine which make of drill would give us best all-around performance with least service worries.

"Employees agreed SKIL Drills handled best with least fatigue—even in cramped places. Management voted for SKIL fast local factory branch service and low maintenance. No other brand measured up to SKIL!"

All 26 SKIL Drill models have these features

Modern, Compact Design • Helical Gears • Die-Cast Aluminum Housing • Oversize Brushes • Reserve Power • Static and Dynamically Balanced Motors • Optional speeds available on many models.

Capacities: $\frac{1}{4}$ " to 1" in steel, 2" in hardwood • Speeds: 200 r.p.m. to 5000 r.p.m.



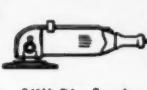
SKIL SAW



SKIL Driver



SKIL Belt Sander



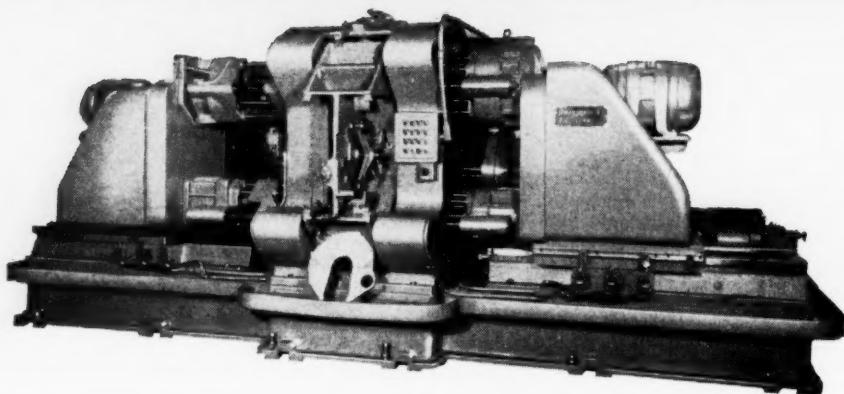
SKIL Disc Sander

SKIL

Made only by SKIL Corporation, formerly SKILSAW, Inc., 5033 Elston Ave., Chicago 30, Ill.
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For complete information, contact your SKIL distributor or call your nearby SKIL factory branch

SPECIAL DOUBLE-END DRILLING, BORING and TAPPING MACHINE



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*We solicit your inquiry as to any special drilling,
milling or boring operations you may have.*



ICHIGAN DRILL HEAD CO.

971 E. EIGHT-MILE ROAD



HAZEL PARK, MICH.

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OPEN MESH SANDING FABRIC

PATENT
APPLIED
FOR

REVOLUTIONARY DISCOVERY... "HEARD 'ROUND THE WORLD"!

The world-wide demand for our latest abrasive development, GRITCLOTH, has already forced us to increase our production capacity. Right now, we are keeping abreast of the still growing clamor for this most advanced sanding material.

GRITCLOTH gives the removed particles a place to go, and thereby maintains fast cutting action throughout its amazingly long life.

For machine and hand sanding or polishing - wet or dry - it's GRITCLOTH. Order now!



Marine Finishes . . . Fast, smooth prime-coat rubbing — WET, or DRY. Extra-long life with GRITCLOTH.



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★ 10 to 15 TIMES LONGER LIFE than the conventional types of coated abrasives.

★ APPLICATIONS ARE LIMITLESS . . . each day finds a new successful operation for this Miracle Modern Sanding Fabric.

Where
can you
use it?

★ NON-LOADING... OPEN MESH LETS THE REMOVED PARTICLES FLOW RIGHT THROUGH.

★ THOUSANDS OF SUPER-SHARP EDGES KEEP ON CUTTING.

★ USE WET OR DRY

★ FLAT OR FOLDED

★ BY MACHINE

OR HAND

★ BOTH SIDES

WESTBURY, MASS.

GRITCLOTH

#320

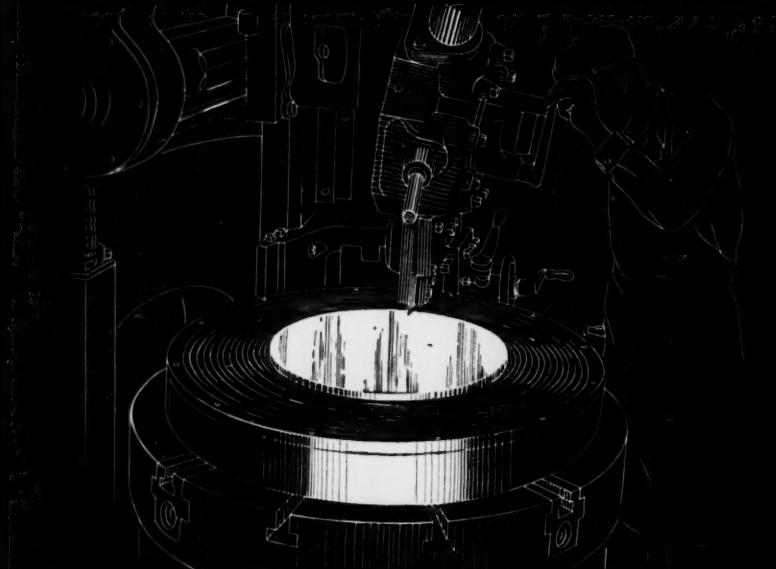
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Magna-Lock electro-magnetic
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Rectangular...rotary...swiveling. Wide range of sizes and voltages. 22% more magnetic area...pieces held to extreme edges of chuck. Moisture-proof. Exclusive all-steel construction. Many other advantages.

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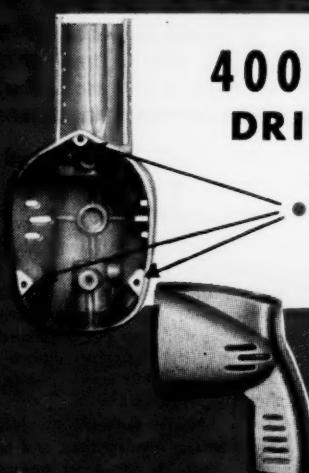
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BIG RAPIDS MICHIGAN, U. S. A.

ON A-S-A NATCO PROVIDES
High Production plus Flexibility

TO DRILL THOSE SMALL PARTS

**400 SMALL PARTS
DRILLED or TAPPED
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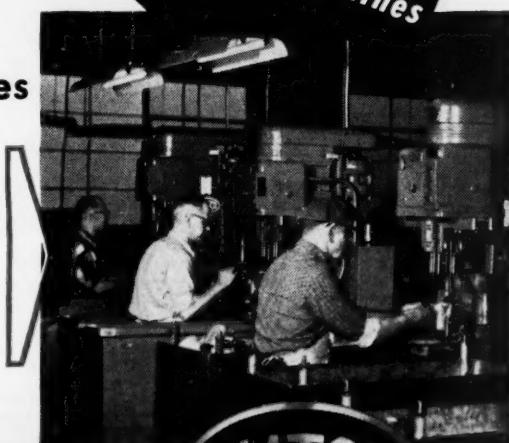
- THREE .1065 HOLES DRILLED
OR TAPPED 6-32 TAP
IN HAND DRILL HOUSING



*JUST ONE OF MANY PARTS
drilled and tapped
on these NATCO High-Speed
adjustable A 33 A machines*

Another example of
light sensitive machines

**NATCO
ENGINEERED**
for Quality
and Quantity
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NATCO DRILLING, BORING, FACING AND TAPPING MACHINES

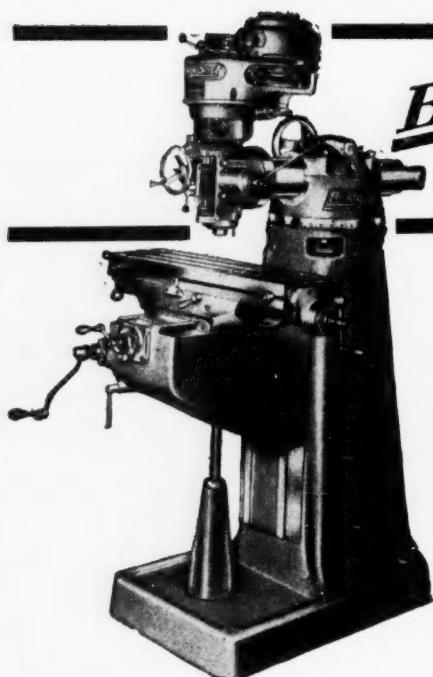
NATCO

NATIONAL AUTOMATIC TOOL COMPANY, INC., Richmond, Indiana

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Bridgeport

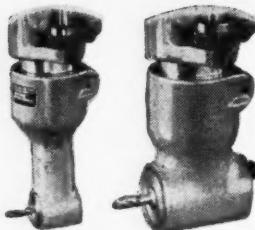
**The Machine that
mills, drills, bores and shapes
at all angles with one set up**

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The BRIDGEPORT TURRET MILLING MACHINE . . . familiarly known in metal working shops as the "Bridgeport Miller" . . . is in a class all by itself in versatility, utility and accuracy. It is not only several machines designed and built into a single unit, but it performs each of its individual functions equally well . . . with highest precision.

There is never an idle moment for this outstanding machine tool, recognized and accepted as a "must" in the hundreds of modern tool rooms and die shops where it is in daily operation. It is, in fact, the "busiest machine in the shop" because of its capacity to handle repetitive small work on a production basis.

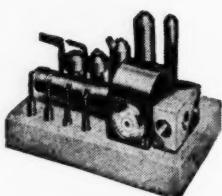
Get all the facts concerning the "BRIDGEPORT" . . . from your nearest dealer or from us direct. Investigate the attachments available.



Right Angle Attachments

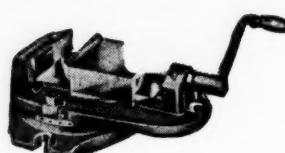
(Left) Light Duty . . . for right angle milling and drilling narrow, deep molds and cavities.

(Right) Heavy Duty . . . for milling and drilling at right angles. Fits both Master and 1 HP Bridgeport Heads.



No. 2 Boring Head

Boring Tools and Holder provide the means of boring holes up to 6" diameter. Available for use on Bridgeport 1 HP Milling, Drilling and Boring Attachment.



Milling Machine Vise

An improved vise providing great gripping power. Streamlined for attractiveness; equipped with coolant trough. Rigid holding assured by large diameter screw. Two sizes: 5" x 3 1/2" and 6" x 5" jaw openings.

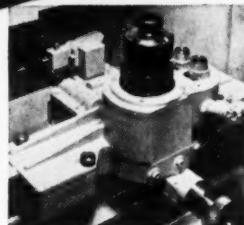
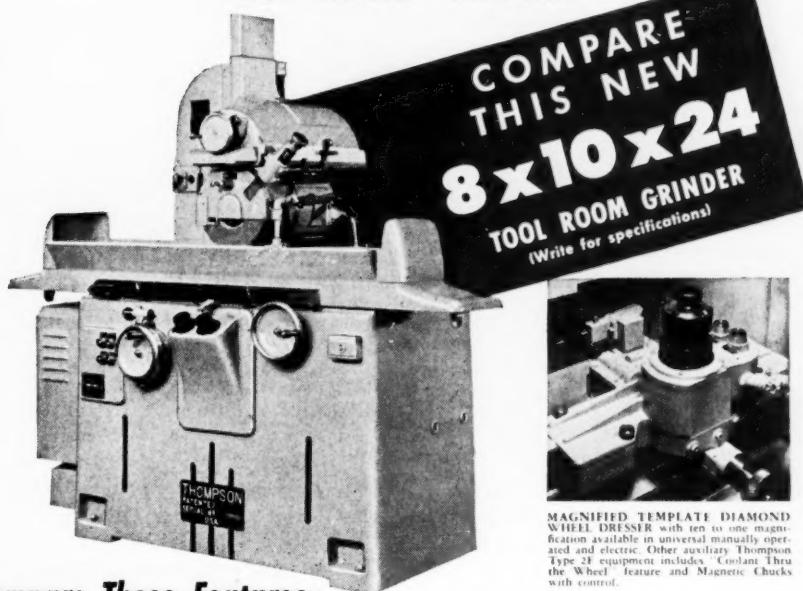
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Bridgeport MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

Thompson Type 2F SUPER PRECISION Tool Room Grinder



Compare These Features:

- HARDEDEN AND GROUNDED cross slide ways completely sealed.
- One shot lubrication to cross slide ways and internal saddle bearings.
- HARDEDEN AND GROUNDED sealed anti-friction vertical slide.
- HARDEDEN AND GROUNDED BED WAYS with automatic lubrication.
- 3600/1800 R.P.M. 2 speed wheel head. Heavy alloy steel spindle heat treated, runs in super precision ball bearings accurately preloaded, lifetime lubricated.

- Handy control panel.
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- Automatic wheel TRUING device.
- Longitudinal hand wheel with automatic engagement.
- Hydraulic head movement throttle with rapid traverse.
- Hydraulic table movement throttle.
- Elevating hand wheel graduated in .0005".
- GROUND THREAD FEED SCREW.

WRITE TODAY for complete specifications and performance data. Address Dept. 10, Thompson Grinder Co., Springfield, Ohio.

◆ The only manufacturer of a complete range of heavy duty and light duty surface and contour grinders for industry.

The Thompson Grinder Company, Springfield, Ohio

**Thompson
SURFACE
Grinders**

UNCLE!

Are your machines begging for mercy because of misuse?

Blanchard Grinders, with proper grinding wheels, can and do give high production with extremely close tolerances for dimension and flatness. However, a No. 11 Blanchard user recently received erroneous advice on abrasive wheels from an outside source. The result was that 35 high-speed cam plates were ground on both sides in 1½ hours with surface finish of 24 micro-inches.

By referring the problem to Blanchard, it was easily demonstrated that the No. 11, with correct grinding wheel, would give desired results—90 to 100 cam plates per hour, with surface finish of 4 micro-inches, dimension tolerance of $\pm .0002$, and flat within 2 light bands.

Blanchard wheels are best for Blanchard Grinders—let Blanchard give you the benefit of their vast experience so that you too can get the most from your Blanchard machines.

Information on correct surface grinding procedure and wheel selection are given in "Work Done on the Blanchard" and "The Art of Surface Grinding." Write for free copies today!



*"PLEASE CONSULT THE
ENGINEERS WHO DESIGNED ME,
AND LET THEM SPECIFY THE
CORRECT BLANCHARD WHEELS,
SO THAT I CAN WORK FOR YOU
BETTER, FASTER, AND CHEAPER"*



PUT IT ON THE **BLANCHARD**
THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

Backed By Years of Experience
in the **MANUFACTURE** of
CUTTING TOOLS...

**THE CLARKSON
CUTTER GRINDER**

Simplicity . . . Speed . . . Economy are featured in the Clarkson Cutter Grinder . . . designed specifically for use in the manufacture of Clarkson Milling Cutters. All of the desirable features recognized as essential through years of experience, to the manufacture of cutting tools are incorporated into the Clarkson Cutter Grinder, yet it is low in cost, *right* for use in *your plant* for resharpening

- ★ END MILLS
- ★ SLOT DRILLS
- ★ REAMERS
- ★ WOODRUFF CUTTERS
- ★ T-SLOT CUTTERS
- ★ COUNTERBORES
- ★ COUNTERSINKS
- ★ SPOT FACING CUTTERS
- ★ SIDE AND FACE CUTTERS
- ★ CYLINDRICAL CUTTERS
- ★ FACE MILLS
- ★ ANGLE CUTTERS
- ★ and HOLLOW MILLS

Write today for **FULL INFORMATION**
on the Clarkson Cutter Grinder . . .



Clarkson, Incorporated
320 Ontario Street
Toledo, Ohio
Gentlemen:
Please send full information and prices on the
Clarkson Cutter Grinder.

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COMPANY.....
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DEDLOCK CHUCKS • AUTOLOCK CHUCKS • MILLING CUTTERS • CLARKSON CUTTER GRINDERS

320 Ontario St., Toledo, O.

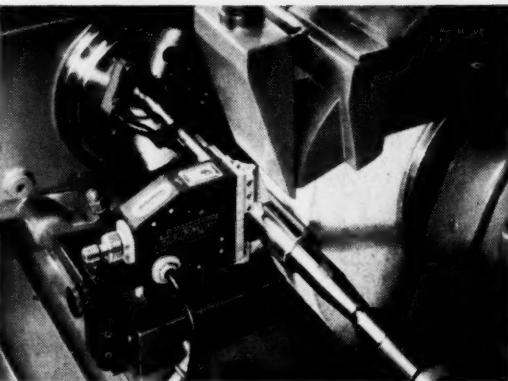
Fortuna Cylindrical Grinders

Plain and Universal Types

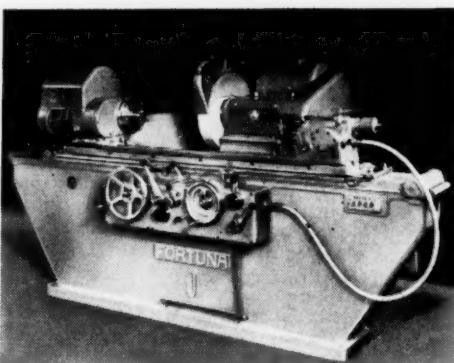


GRINDING

Fortuna Grinders, for plunge cut or traverse grinding, are made in several types and sizes to accommodate workpieces up to 23½" diameter and 88" between centers . . . To increase production efficiency these hydraulically operated machines have single lever control for all operations of a pre-determined set-up . . . Numerous attachments are available to increase production and simplify grinding operations . . . For extremely accurate work, the grinders can be equipped with FINITOR Automatic Sizing and Measuring Instruments that automatically control the grinding operations and hold size tolerances up to $\pm .00004"$.



Finitor Automatic Sizing and Measuring Instrument, mounted on Fortuna Grinder, automatically controls grinding operations and holds size tolerances up to $\pm .00004"$.



Type ES630 Fortuna Cylindrical Grinder

Send us the details of your grinding jobs. Cosa engineers will recommend the proper Fortuna Grinder. Or, write for Catalog.

COSA CORPORATION

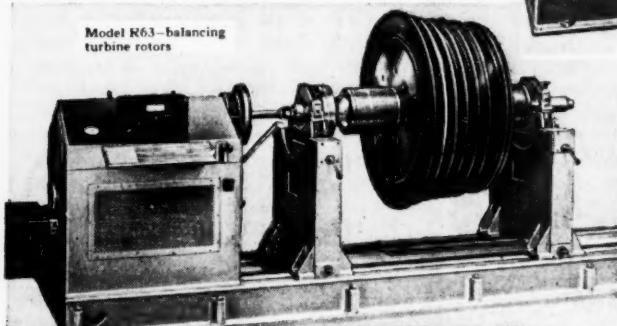
405 Lexington Ave., New York 17

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from Small Bench Lathes to Large Boring Mills

IN DETROIT AREA contact DETROIT-COSA CORPORATION, 16923 James Couzens Highway, Detroit 35, Mich.

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SCHENCK
ELECTRO-DYNAMIC BALANCING MACHINES

Now, in a fraction of a minute and in a single run, you can accurately determine the amount and location of dynamic and static unbalance on rotating parts. The SCHENCK Electro-Dynamic Balancing Machine has a sensitive and accurate electrical measuring system—without electronic tubes or oscilloscope—that will indicate unbalances caused by displacements as little as 0.00004" from the center of gravity. Simple and easy to operate, the SCHENCK Balancer, by coordinate measurement, quickly indicates on a Wattmeter the unbalance of the rotating part.



SCHENCK ELECTRO-DYNAMIC BALANCING MACHINES ARE THE RESULT OF 40 YEARS WORLD-WIDE EXPERIENCE. THEY ARE MADE IN MANY CAPACITIES TO BALANCE ROTATING PARTS WEIGHING UP TO 100 TONS.

Machine Type	R13	R23	R33	R43	R53
Measuring Range	1-22	3-66	1-220	3-660	11-2,200

(Weight of part in lbs.)

Machine Type	R63	R73	R83	R93
Measuring Range	33-6,600	110-22,000	330-66,000	1100-220,000

(Weight of part in lbs.)

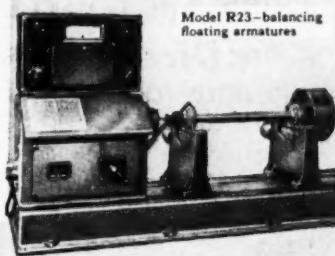
Let Cosa Engineers recommend the proper Schenck Balancer for your needs. Or, send for detailed catalog.

COSA CORPORATION

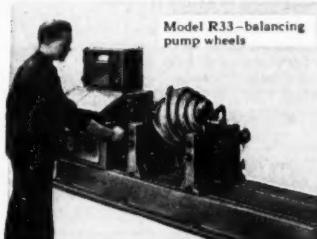
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IN DETROIT AREA contact DETROIT-COSA CORPORATION, 16923 James Couzens Highway, Detroit 35, Mich.

Model R23—balancing floating armatures



The workpiece is balanced easily by adding or removing weight units at two of the four balancing points located within the coordinates, 90 degrees apart. For many production installations, Schenck Balancers combined with machine tools—check, correct and inspect parts in one set-up.



Model R33—balancing pump wheels

McCROSKEY

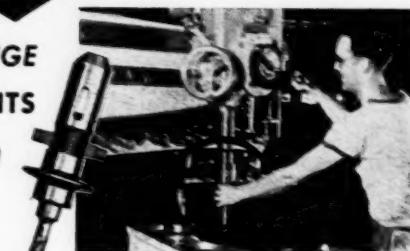
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CUTTING
TOOLS**

Wizard [®] QUICK-CHANGE CHUCK AND COLLET OUTFITS

are **Direct Driven**
AND HOLD TOOLS CENTERED
AND RIGID . . .

Two driving lugs on the Collet engage drive slots in the Chuck. Consequently, the positive drive of the spindle is imparted directly to the centered, rigidly held tool.

Collets are locked in chucks and disengaged easily — without even slowing down the spindle—making multiple tool jobs continuous.



Standard sizes for tools with No. 1 to No. 5 Morse Taper Shanks; also collets with Jacobs chucks for straight shank tools; and collets that permit high speed, accurate tapping without danger of tap breakage. Write for Bulletin No. 19-C.

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Chucking reamers with straight or tapered shanks, also shell reamers with tapered holes or large straight holes. Standard sizes from 15/16" to 6" in diameter. Write for Bulletin 18-R today.



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Individually ground, tapered V-key centers the block and cutting blades accurately and rigidly yet permits easy release for regrinding. Write for Bul. 18-B.



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McCroskey "Specials" combine two or more boring, facing, chamfering or reaming operations into a single tool, cutting set-up time and costs. Write for Bulletin 17-S today.



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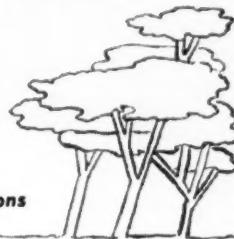
Engineering and Sales Representatives in the Principal Cities



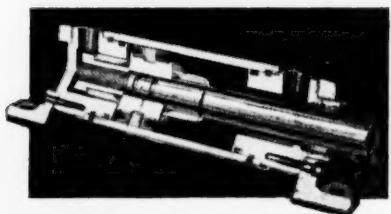
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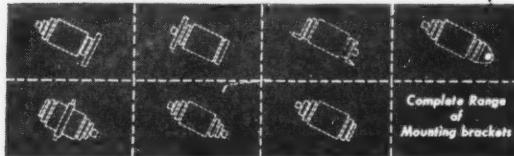


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Write today for **FREE catalog** and complete set of $\frac{1}{2}$ and $\frac{1}{4}$ -scale templates showing all cylinders and mounting brackets.

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interchangeable bore for bore

From a smooth, delicate push on a testing machine to a rugged thrust on a press application, O-M Cylinders handle all straight-line motion problems with ease and precision. *Special interlocking mechanism* eliminates needless tie rods, end caps . . . saves $\frac{1}{3}$ INSTALLATION SPACE. Also assures better alignment, gives O-M the lowest coefficient of friction of *any cylinder* . . . smoother performance at low or high pressure regardless of length of stroke. End plugs tapped for universal mounting. Any one or combination of mounting brackets may be used to install . . . *without disassembling or changing cylinder*. Easily removed, inspected, repaired.

Available in a full range of sizes (1 $\frac{1}{2}$ " to 8" bores) with standard, 2 to 1 or oversize rods. All machined steel with bearing bronze, no castings. Completely interchangeable parts.

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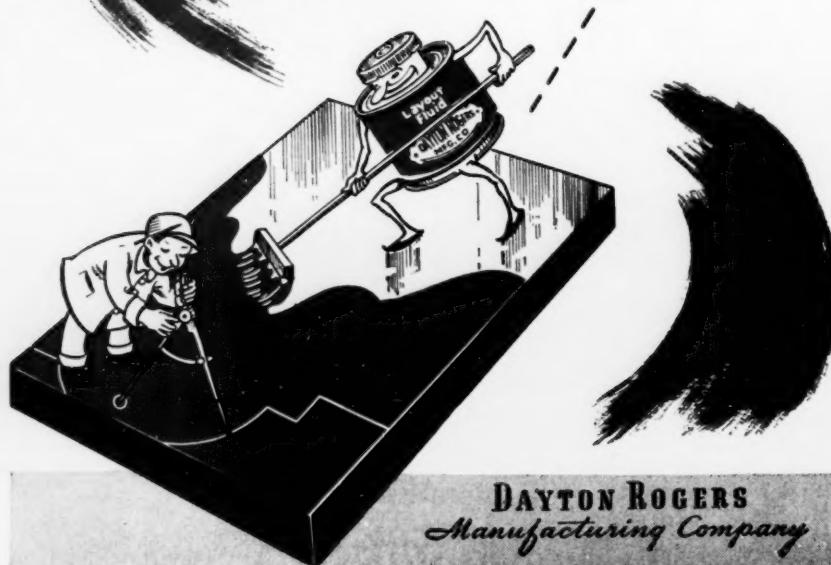
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Applicable to all metal. One merely wipes the surface clean and then brushes on the Layout Fluid.

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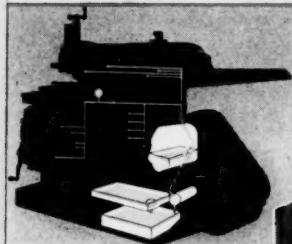
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50 lbs. oil pressure

IS NECESSARY WITH
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This tremendous cut demonstrates the extra strength, rigidity, and power in Cincinnati Shapers. It also demonstrates the ability of the 50 p.s.i. lubrication system to develop and maintain oil films under the heaviest loads.

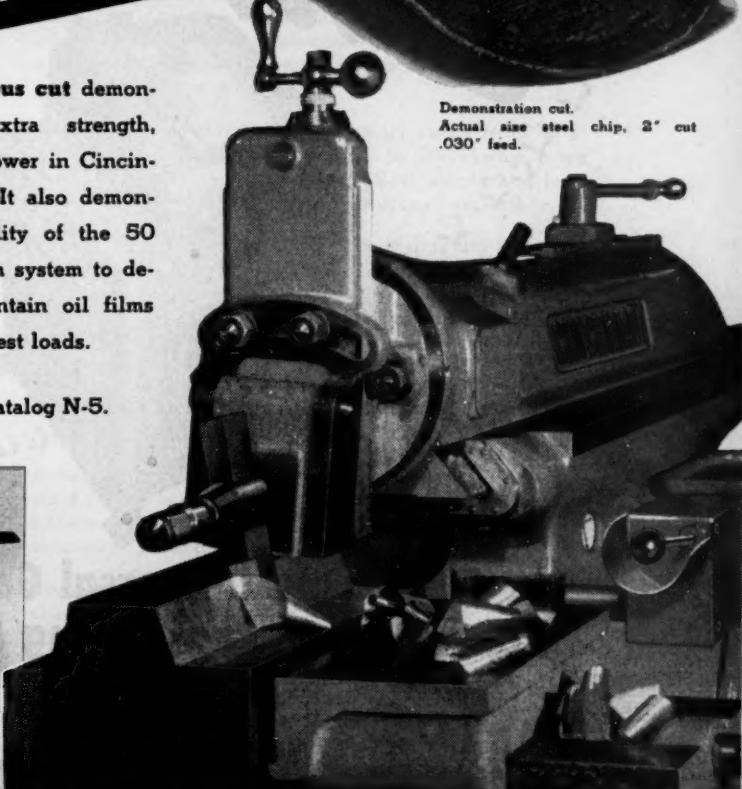
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50 p.s.i. system includes 50 micro filter, settling basin and reservoir. Transmission runs submerged in oil.



Demonstration cut.
Actual size steel chip, 2" cut
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The First Truly Universal Gear Burring and Chamfering Machine

At last, you can burr and chamfer the entire tooth form of both spur and helical gears from $\frac{3}{8}$ to $9\frac{1}{2}$ -inches pitch diameter, as well as external straight and involute form spines on the new Universal Burr-Master by Modern.

*Patents
Pending



The new BME Universal Model Burr-Masters will solve your gear and spline deburring and chamfering problems at production rates heretofore impossible. Truly the answer to a normally costly gear and spline production operation, Modern's new Universal Burr-Master is . . .

universal . . .

because it doesn't sacrifice speed for versatility. Operating continuously, the machine deburrs and chamfers more than five teeth per second. A typical 22-tooth gear can be completely finished at a rate of more than 600 per hour, at 80% efficiency.

universal . . .

because new models have a capacity range from $\frac{5}{8}$ to $6\frac{1}{2}$ -inches pitch diameter and 3 to $9\frac{1}{2}$ -inches pitch diameter for popular pitch gears. Both single and two-station models are offered for additional versatility.

universal . . .

because an unskilled operator can change the precision tooling for a different part in about 10 minutes setup time.

universal . . .

because it automatically compensates for minor stock variations in production parts. This unique design feature lets you deburr and chamfer gears or splines that are slightly oversize or out-of-round without affecting the operating cycle.

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universal . . .

because precision form-cutting tools can be removed, sharpened and replaced by an unskilled operator without worry as to gaging or alignment to retain correctness of form. Long tool life, too.

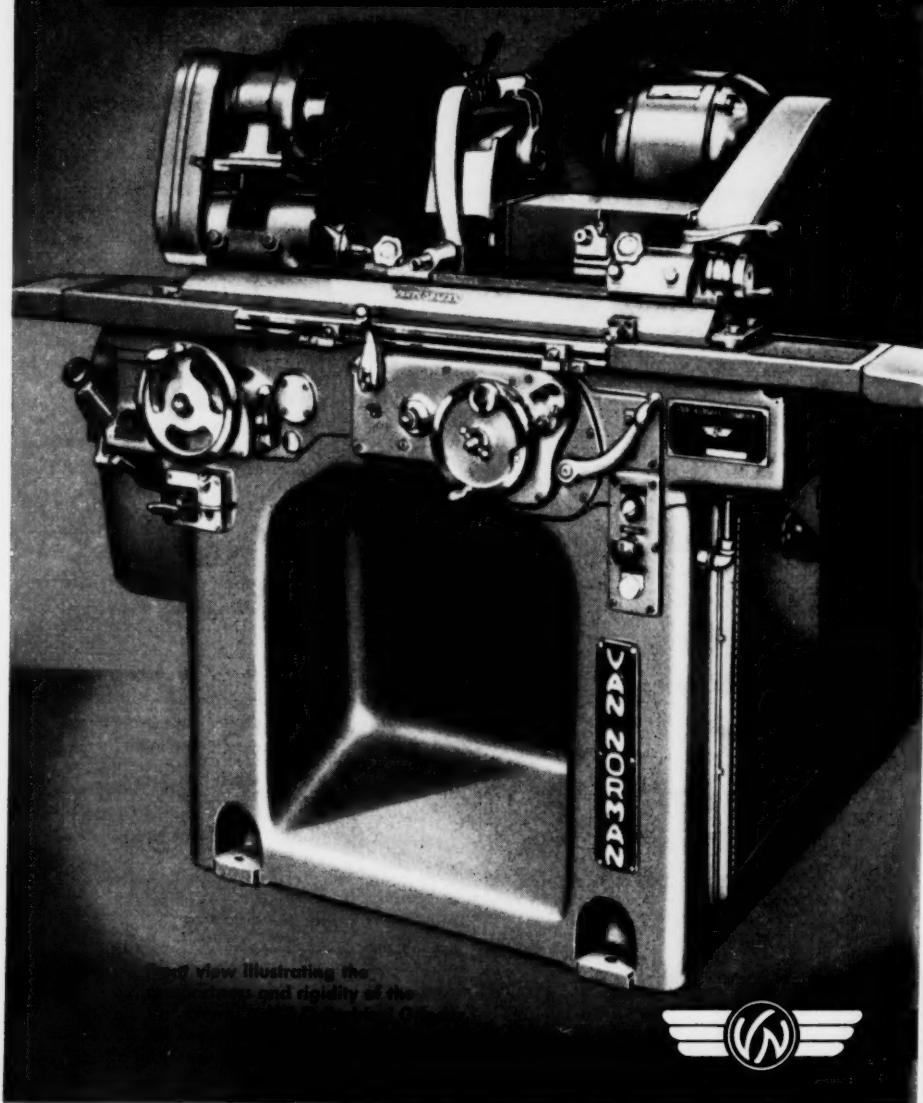
For complete details, write
today for Bulletin 103-60

14230 BIRWOOD AVE.

DETROIT 4, MICHIGAN

MODERN
Industrial Engineering Co.

VAN NORMAN 418

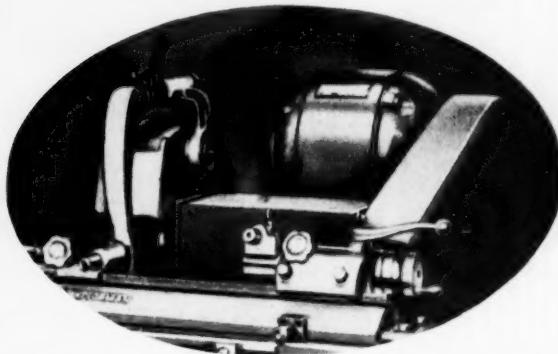


Front view illustrating the
accuracy and rigidity of the
Van Norman 418.



CYLINDRICAL GRINDER

***Engineered for Fast, Economical
"Close-Tolerance" Plunge or Traverse
Grinding of Small Parts***



Grinding unit designed for maximum accuracy and long life.
Pope wheel spindle equipped with heavy-duty, extra-large SKF double-row cylindrical roller bearings, assures smooth chatter-free finish.

The Van Norman 418 Cylindrical Grinder is completely engineered from base to bearings to give heavy machine performance. It is particularly adaptable for economical grinding in toolrooms, job shops or plants where work is usually in small or medium runs. Controls are conveniently grouped for ease of operation.

Write for bulletin giving complete details. Especially inquire about the price. It's exceptionally low for a quality grinder.

OTHER VAN NORMAN FEATURES

- Heavy-duty headstock and footstock for rigidity, accuracy and smooth grinding
- Single lever control for rapid traverse and plunge grinding
- Automatic starting and stopping of headstock and table traverse
- Rugged base, wide table bearing ways, separate motor drives for wheel spindle, table and headstock
- Floor space needed, only $43\frac{1}{2}'' \times 79\frac{1}{4}''$

VAN NORMAN COMPANY, SPRINGFIELD 7, MASS.

Only
ONE
can be
called
the
Finest:



... here's another good reason why:

**CARLTON'S
LOW HUNG
DRIVE**

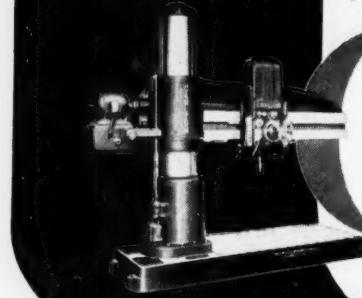
BRINGS THE HEAD and SPINDLE down to the work . . . not just the spindle.

Spindle accuracy and rigidity are assured because the spindle is always close to the radial arm support. This design eliminates spindle twist, which is one cause of vibration, thus reducing manufacturing costs by increasing tool life.

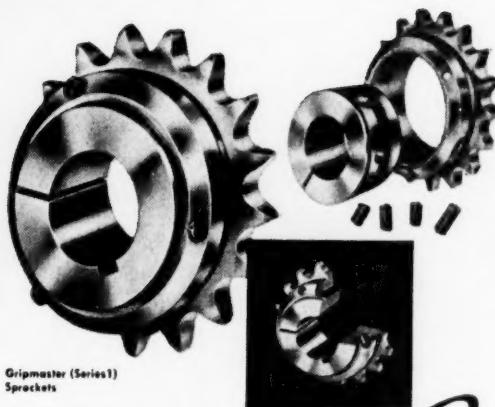
The main drive gear is placed in the lowest part of the head. It drives on the largest diameter of the spindle, closest to the cutting tool . . . a principle well established by its wide use in planers, lathes and milling machines. This permits the greatest amount of torque transmission.

Carlton's low hung drive . . . plus all-ball-bearing construction, centralized pushbutton control, modern lubrication, 3-unit power clamping of arm, head and column, and Carlton's many other advantages . . . means increased 'hole' production for you.

Write today for bulletins describing the Carlton Radial Drills you need. The Carlton Machine Tool Co., Cincinnati 25, Ohio.



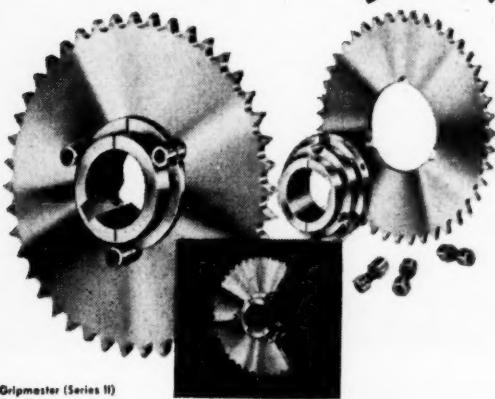
Carlton
radial drills



**IT'S NEW
IT'S DIFFERENT!**

A revolutionary, all steel sprocket system that is rugged, light and compact. Featuring interchangeability, maintenance ease and simplicity, the Cullman Gripmaster sprocket system embodies fundamental design principles which are uniquely adapted to achieve a perfect gripping action throughout a complete sprocket range.

CULLMAN *Gripmaster*
S P R O C K E T S



Gripmaster (Series II)
Sprockets

Check these advantages!

- "Off-the-shelf" service
- Reduced inventory requirements
- Alterations eliminated
- Positive shaft fits
- Simplified speed changes
- Minimum service requirements

Contact your local distributor
for further information.
Meanwhile, send the coupon
for your copy of the
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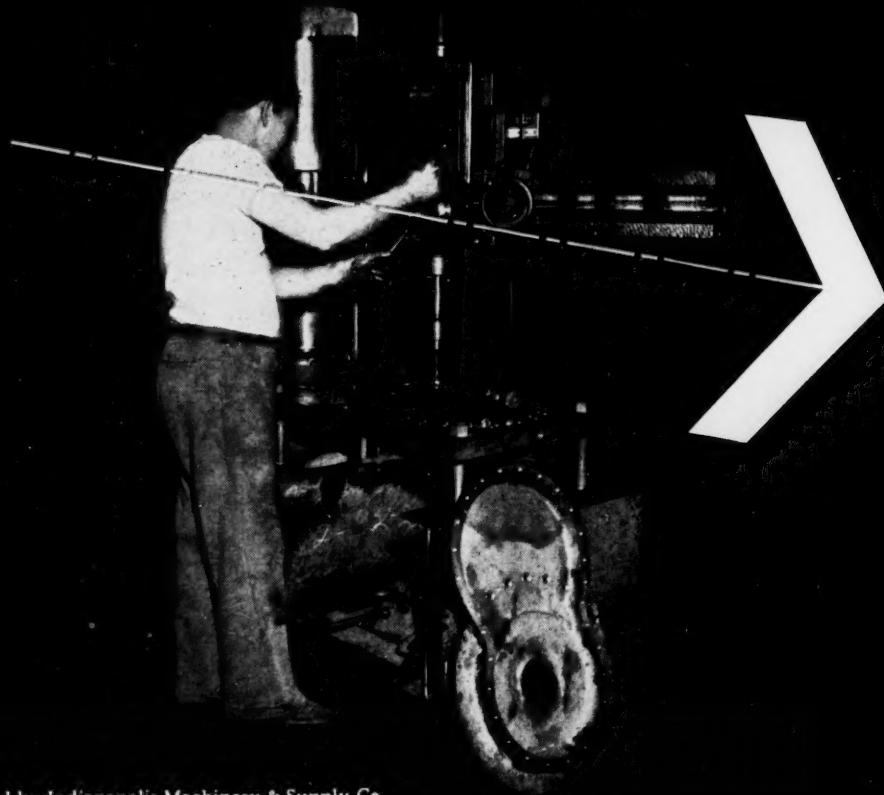


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Please send me your new illustrated Grip-Master catalog
giving tables of specifications and prices.

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Company.....
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Distributor.....

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Installed by Indianapolis Machinery & Supply Co.

Drilling and tapping cast iron tank transmission parts at Dickey & Sons, Inc., Indianapolis, Indiana, one of the many job shops whose Cincinnati 37" Radials have "paid off" very quickly, as proven by careful record-keeping. This radial has a high "earning rate per square foot of floor space" because 1) it's inexpensive, and 2) a lot of work falls within its 1-inch capacity. Your Cincinnati representative will gladly arrange a demonstration.

best buys in their class!

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CINCINNATI LATHE & TOOL CO., CINCINNATI 9, OHIO, U. S. A.

MORE WORK/DOLLAR

Cincinnati 37" radials are truly economy-priced light-duty machines whose 1" capacity handles a wide range of work.

Unit construction throughout

Anti-friction bearings throughout

All geared head

with automatic lubrication

9 spindle speeds

in geometric progression

30 to 1 overall ratio

6 power feeds

Simple direct drive

All speed and feed transmission gears

of alloy steel, hardened

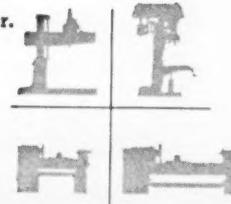
This cost-saving radial is just one of the complete balanced line of Cintidrills, including 21" sliding head box and round column floor drills; 14" 3000 and 16" 3000 sliding head bench and floor drills; 16" and 18" Royal Cintidrills, bench and floor models, single and multiple spindles.

Write for catalogs and name of your nearest dealer.

best buys in their class!

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1/4 H. P. CONVERTICAL MILL HEAD

Only low cost mill head with quill travel attachment.

High speed medium-light operation.

For bench, floor and pedestal mills.

Fits milling machines with overarm 1½" to 3".

¾" end mill capacity.



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HEAVY DUTY MILLING ATTACHMENT

Fits milling machines with 3" to 5" overarm.

¾" end mill capacity.

For vertical, horizontal and angular operations.



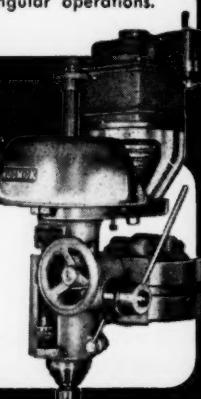
1 H. P. MILL HEAD

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Fits milling machines with 3" to 5" overarm.

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For vertical, horizontal and angular operations.



WRITE for complete details and give name of your supplier

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RUSNOK TOOL WORKS, 4840 W. North Ave., Chicago 39, Ill.
MILLING • DRILLING • BORING



**"better than
6 to 1
INCREASE IN
PRODUCTION ON A
VERY TOUGH JOB"**



says
RAYMOND NEWSWANGER
Tooling Foreman of
NEW HOLLAND MACHINE CO.
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PIVOT HIGH SPEED STEEL **PUNCHES**
STRAIGHTGROUND • WHIPSLEEVED

★ Punching two 11/32 holes in the vertex of 3/16-inch hot rolled angle stock resulted in ordinary punches breaking at 1 to 1200 pieces — at New Holland Machine Co., New Holland, Pa.

Mr. Newswanger says:

"Since installing Pivot Punches (Series XS) we are getting runs of 7,500 pieces without breaking a single punch.

We have also experienced longer punch life on other die sets after installing Pivot Punches which we highly recommend."

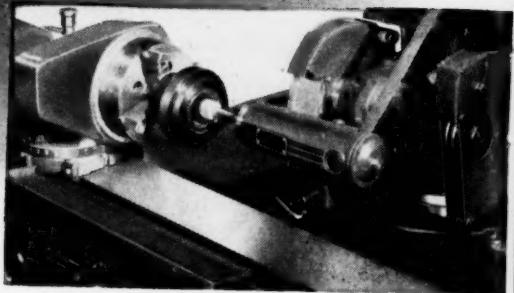
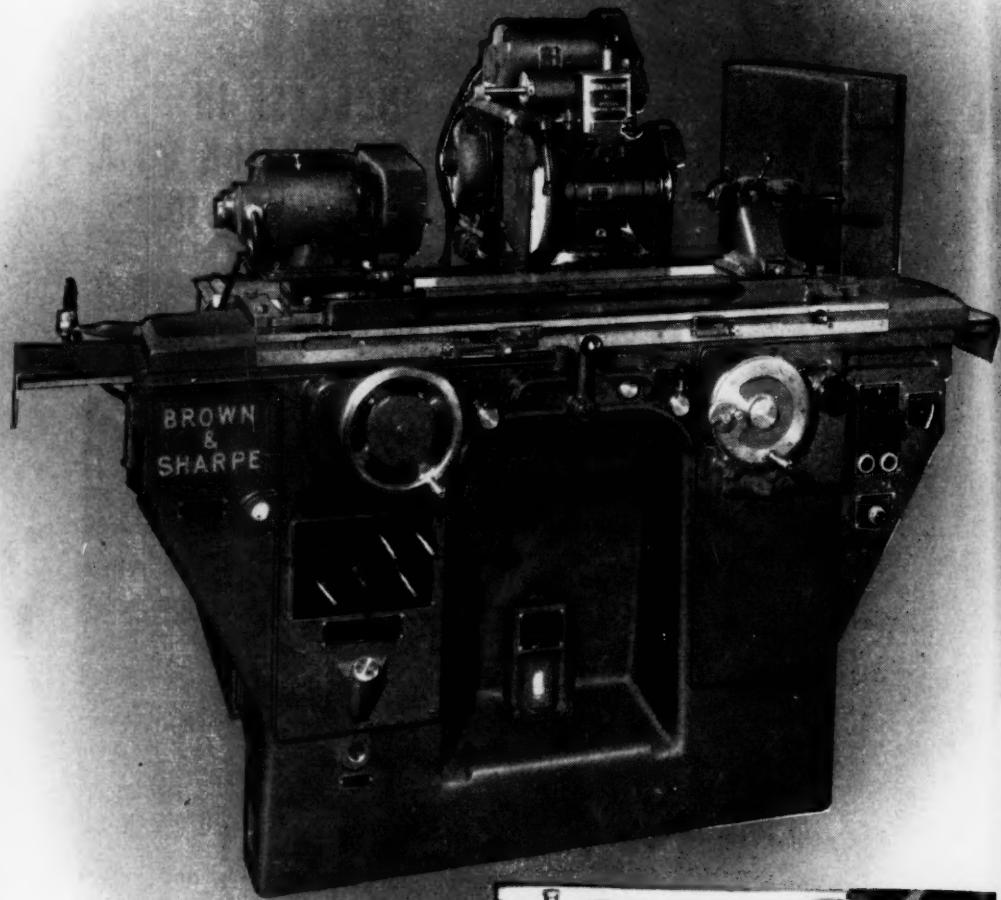
★ Put Pivot Punch power, accuracy, longer punch life and higher production to work for you at lower costs. Write for FREE Catalog and standard prices. Write Dept. M.M.



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NORTH TONAWANDA, N. Y.

**New in concept
New in versatility, too...**



4 Completely New Universal Grinding Machines

Combination Shoulder and Straight Grinding. Note wheel is mounted on right end of spindle. Continuous In-feed Arrangement (optional) assures smooth accurate finish on shoulder face. When straight grinding, wheel can be fed automatically on each or alternate reversals. Separate dwell controls assure "grind-out" at shoulder without delaying reversal at other end of work.



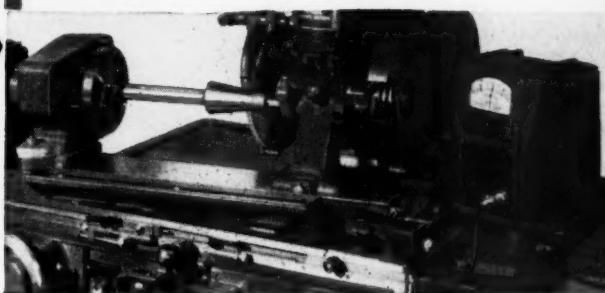
Taper Grinding. Extremely accurate taper is established by the Electro-align (optional). Minute adjustments of swivel table are indicated directly on the amplifier dial.

Internal Grinding straight and tapered hole in one set-up. Table travel is used to grind straight portion, and cross feed is used to grind taper. Internal spindle nestles into the wheel spindle head when not in use.

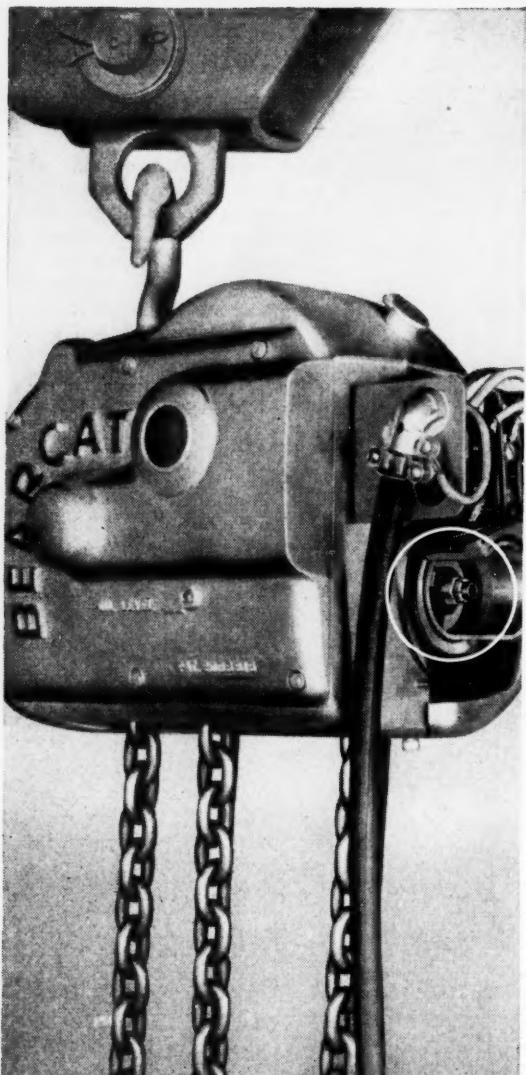
Size	Swing	Centers take	
		Nom.	Max.
1*	10"	20"	22 $\frac{3}{4}$ "
2	14"	30"	33 $\frac{3}{4}$ "
3	14"	40"	43 $\frac{3}{4}$ "
4	14"	60"	63 $\frac{3}{4}$ "

*No. 1 machine illustrated

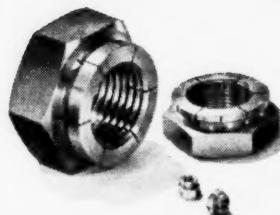
In recent years, the broad gap between conventional universal and single-purpose grinding machines has been a serious handicap for many manufacturers. To bridge this gap, Brown & Sharpe now offers a line of completely new Universal Grinding Machines. These machines allow you to instantly combine separate manual operations into automatic cycles for many production applications . . . as well as handle the infinite variety of precision work usually encountered in toolrooms and job shops. Many new and exclusive features are fully described in detailed Bulletin. Write Brown & Sharpe Mfg. Co., Providence 1, R. I., U.S.A.



Brown & Sharpe



THE HARRINGTON COMPANY, hoist maker since 1876, uses a FLEXLOC Self-Locking Nut to hold the brake mechanism on its Bearcat Electric Hoist. This nut has proved an effective solution to a difficult problem.



Why FLEXLOCs are better locknuts

Compare the features of FLEXLOCs with those of any other nut, and you'll readily see why we say they are better locknuts.

FLEXLOCs are one piece, all metal. They require no lock-washer, no cotter pin, no auxiliary locking device to keep them on a bolt. They are not affected by moisture, dust or high temperatures. Standard FLEXLOCs are designed for temperatures up to 550° F.

FLEXLOCs are stop and lock nuts. They won't work loose once their locking threads are fully engaged; therefore they stay put anywhere on a bolt. Seating is unnecessary. And FLEXLOCs can easily be removed from a bolt and reused again and again without losing their locking ability.

For more information about FLEXLOCs and samples for test purposes, see your FLEXLOC distributor, or write SPS, Jenkintown 22, Pa.

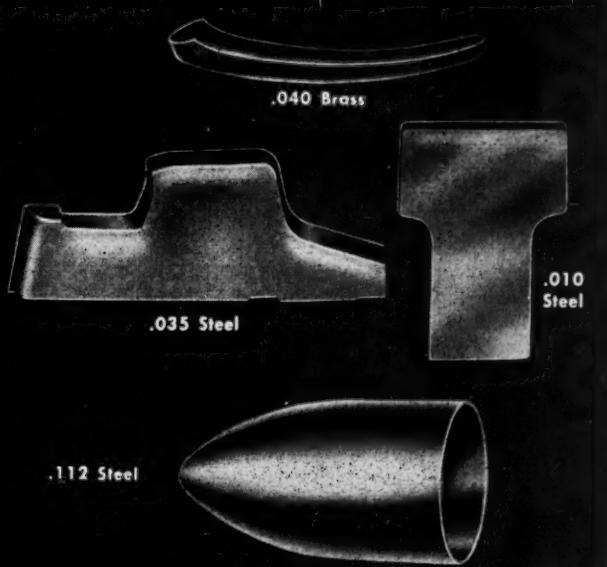
FLEXLOC
LOCKNUT DIVISION

SPS

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Our Fiftieth Year: A START FOR THE FUTURE

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Increase output...reduce costs!

Costly, time-consuming trimming and notching operations can be done in one operation with a Brehm Trimming Die. Don't worry about stock thickness. Edges will be of full thickness—clean, flat, without burrs or distortion at the trimmed edge.

Other Brehm Die advantages! **Workable Materials**—gold, silver, stainless or mild steel, copper, brass, zinc, aluminum, fiber, rubber, plastics, or what did you have in mind? **Quantities vary**—stove or refrigerator doors, auto bumper buffers or typewriter covers, from 264 to 900 per hour. Intermediate parts, where stock and scrap can be blown from the die, about 1200 per hour. **Shapes**—fountain-pen ferrules, artillery cases, watch cases, burial vaults, automotive, kitchen, radio and television

accessories and parts. Almost anything *you* need trimmed.

A Brehm "Shimmy" Trimming Die with angular cams, cuts four ways in one press stroke, handling straight or curved edge contours, with multiple notches and projections. Slow, costly "horn" and "pinch" trimming operations, are eliminated.

Write today... for your free copy of the Brehm Die Catalog. If you wish, submit blueprints or parts for full information or quotation.

Brehm[®]
TRIMMING
DIES

THE
SHIMMY
REG.
DIE

THE STEEL PRODUCTS ENGINEERING CO.

BREHM DIE DIV., DEPT. 21, SPRINGFIELD, OHIO

Outstanding Time

The New Cincinnati Electro-Magnetic Clutch and Brake alone brought a 30% time-saving here



The New Cincinnati Magnetic Clutch and Brake, with its single, convenient control lever, gives the operator the fastest, simplest and most accurate control of his Shaper and converts waste time into productive time.

This powerful clutch and brake requires no adjustment, and has a long, maintenance-free life.

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Shaping time on 7 internal oil grooves in these steel sleeves was reduced from 12.5 minutes to 8 minutes, by the Cincinnati Electro-Magnetic Clutch and Brake.

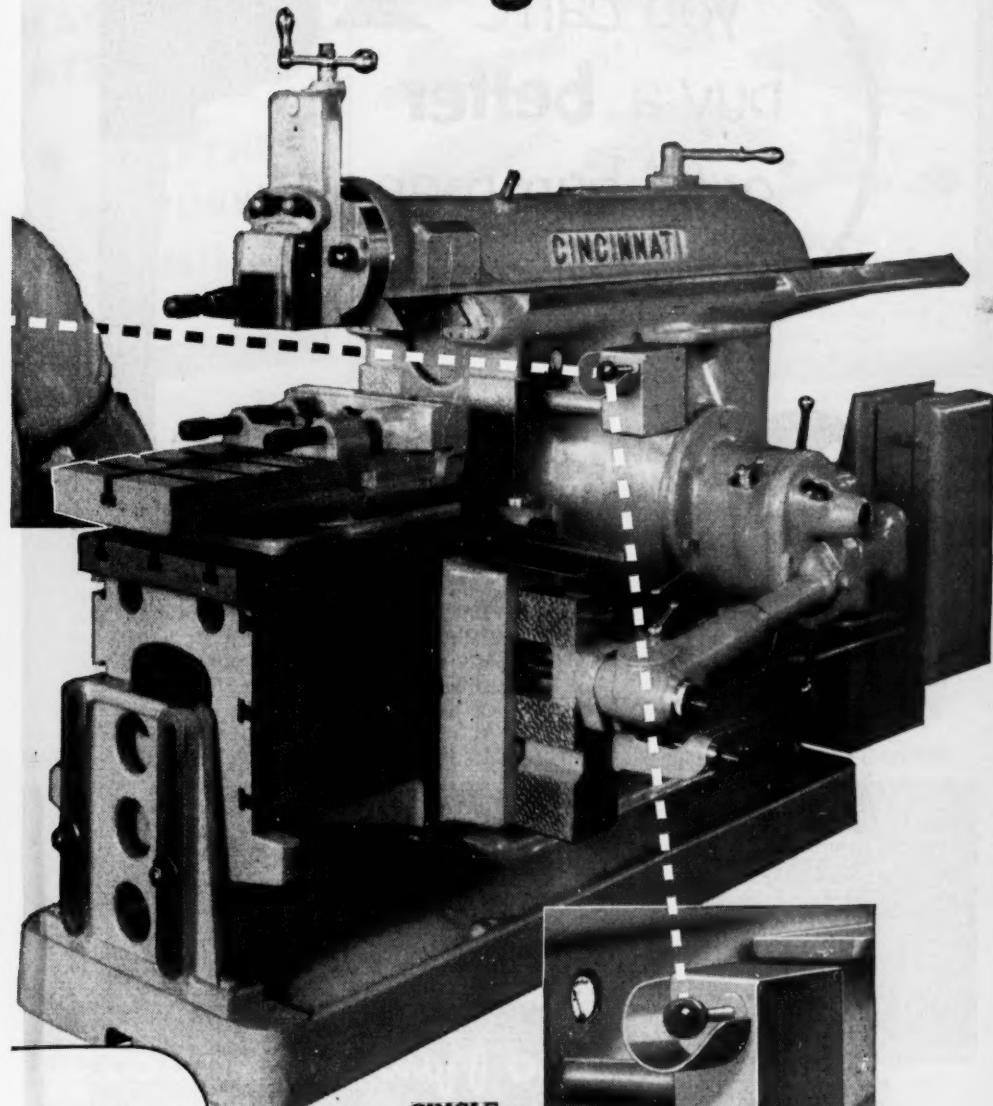


THE CINCINNATI SHAPER CO.

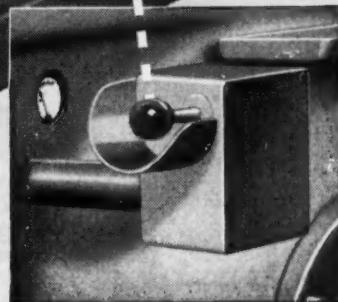
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"soft" hammer
-anywhere!



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NEW FACES IN SECONDS!

Just loosen a
nut and old
faces are
easily replaced.
Tighten nut,
and faces are
in vise-like grip.

There's plenty of power
cushioned in the tough, resil-
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give delicate parts and fine
finishes full protection. And
faces are easily, quickly re-
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Safety-Flare handle. Work
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For further information write Dept. 22

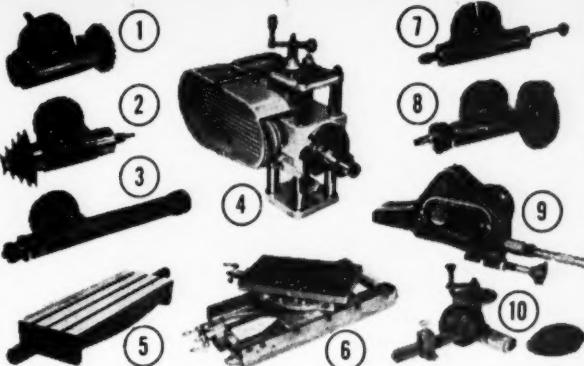
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leading industrial
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C/R Rawhide
mallets and
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4. Basic Milling Unit
5. Milling and Grinding Table
6. Universal Feed Table
7. Internal Grinder Head
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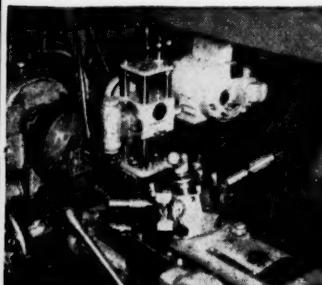
THREE SIZES

MODEL "C," $\frac{1}{8}$ hp — 9" to 13" LATHES
MODEL "B," $\frac{1}{2}$ or $\frac{3}{4}$ hp — 13" to 18" LATHES
MODEL "M," 1 to 3 hp — 18" to 72" LATHES

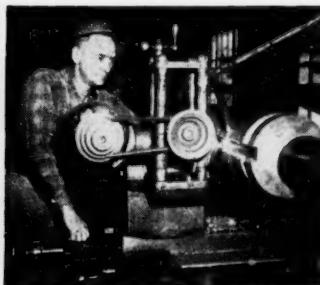
The Master attachment can be used profitably on many production operations. Mount it on your present equipment, lathes, turrets, mills, or use independently to perform additional operations in the same set-up. The basic milling unit with the above types of precision heads gives you facilities for milling, grinding, boring, drilling, indexing, slotting, and keyseating, internal and external. Its full complement of equipment is an outstanding value for maintenance, repair, tool room, and

experimental shops, as well as production, thus performs a full range of shop operations at a minimum investment. These improved models are outstanding in rigidity, capacity, and simplicity of set-up and operation and incorporate the latest features developed in our 17 years of manufacturing this tool. Investigate this valuable shop tool. For the cost of one single-purpose machine, you can have several Master units producing. Prompt deliveries.

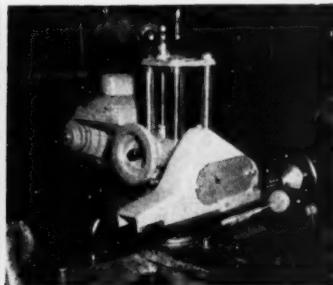
MAKES LOW-COST INDEPENDENT PRODUCTION SET-UPS — PORTABLE — SELF-POWERED



Milling on turret lathe completing part
in one set-up



End Milling $2\frac{1}{8}$ " keyway in $9\frac{1}{8}$ "
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MONARCH SERIES 60 LATHES

5 American Standard Camlock Spindle Nose—for quick, rigid chuck and fixture mounting

6 Flame-Hardened and Precision-Ground Integral Bedways—for sustained accuracy throughout the life of all four ways

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Value BUILT INTO your Lathe

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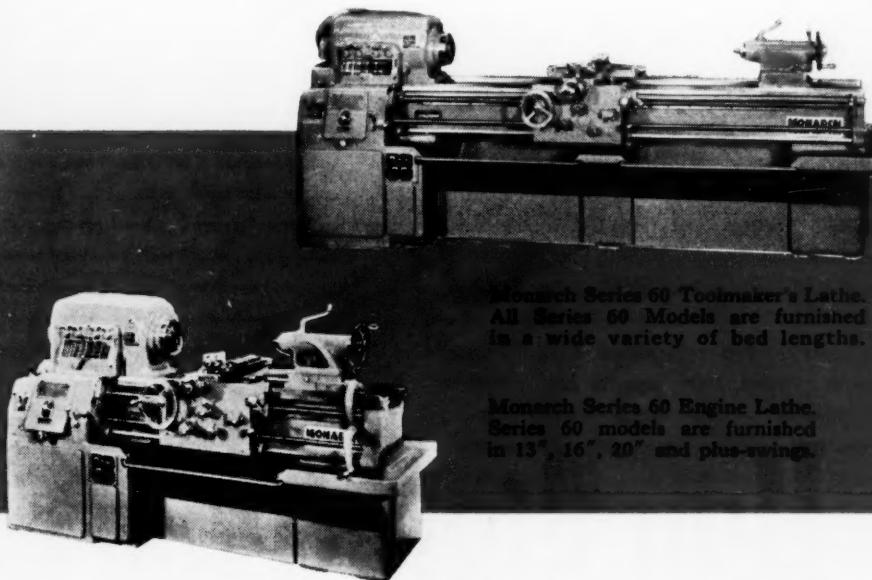
7 All critical parts made of hardened alloy steel—for long, trouble-free life

Isn't it logical? Aren't the costs and quality of your products directly affected by the sustained accuracy, speed, versatility and dependability of your turning equipment?

So look over the Monarch Series 60 product features listed on the opposite page (bearing in mind that almost all of them were Monarch pioneered). Check the extra strength, weight and power of the machines, making them, within their rated capacity, fully capable of sustained heavy production. Then look over the wide choice of accessory equipment that lends such

versatility to the basic Engine and Toolmaker's models. This includes (with Monarch only!) choice of three types of Tracer Controls — including the Air-Gage Tracer which, with further addition of the Auto Cycle Unit, gives you a fully automatic cycle high production unit.

For utmost lathe value for toolroom, production line or maintenance shop — look into the Monarch Series 60! Let us send our Booklet No. 1113 with complete information. Just write! . . . *The Monarch Machine Tool Company, Sidney, Ohio.*



Monarch Series 60 Toolmaker's Lathe.
All Series 60 Models are furnished
in a wide variety of bed lengths.

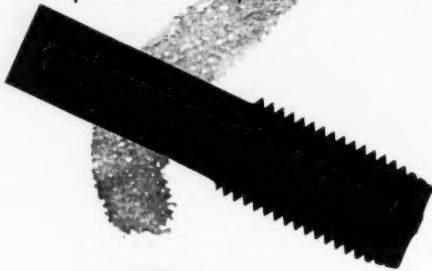
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Series 60 models are furnished
in 13", 16", 20" and plus-swings.

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Monarch

TURNING MACHINES



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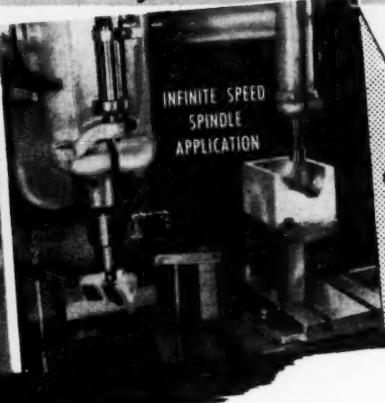


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INFINITE CONTROLLED SPEEDS 30,000 TO 65,000 R. P. M.

*Easily connect jig grinder
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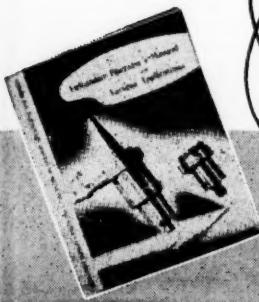
*Other infinitely controlled
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Then you can finish grind in hardened steel to "tenths" . . . jig grind dowel holes square with a ground base . . . move location of holes in hardened steel blocks . . . jig grind interchangeable holes in hardened sections . . . grind small holes with diamond impregnated mandrels . . . grind contours and relief with tungsten carbide burrs . . . grind radii in die sections . . . eliminate jig bushings in tools where close spacing is essential.

Place spindle on most any machine. Use it for finishing contours on hardened steel working surfaces . . . burring or milling die castings . . . routing wood contours . . . carbide milling or finishing slots . . . finishing holes in hardened steel to "tenths" . . . grinding with diamond wheels, carbide burrs, or diamond impregnated mandrels.

Advantages—10 micro finishes using carbide mills . . . 6 micro finishes using mounted points, operates at any angle . . . air driven, air cooled, overheating prevented . . . speed controlled at optimum point . . . 3½" long motor uses little working space . . . By controlling speed at any point you abolish need for many constant speed spindles.

**Dependably accurate to "tenths"*



For immediate quotation please state machine tool application. Get this manual of photos showing operations Vulcanaire performs.

VULCAN TOOL CO., Pritz and Highland, Dayton 10, Ohio

Vulcanaire

It's built by toolmakers for toolmakers.

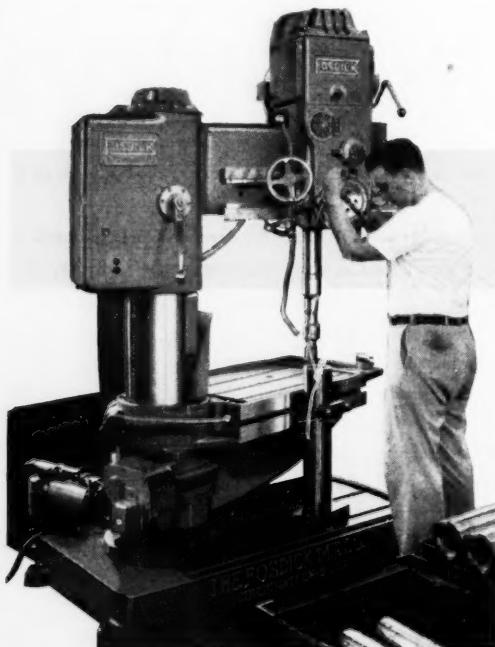


*Here's another reason
it pays to get a proposal
from Fosdick*

We put a table on the

When Fosdick engineers put a table on the radial, a unique and basic machine tool was born. This machine combines the best features of two proven, reliable designs. It gives you the capacity and flexibility of a radial—the rigidity, compactness and convenience of an upright. It's the machine you need when you want versatility and economy in limited floor space.

The arm of the Sensitive Radial swings 360° on the rigid one-piece column. Controls are always at the same convenient height. Work is placed on the adjustable table, or on the base with the table swung out of the way. Drills up to 1½", 12" column, 3' or 4' arm, nine speeds, four feeds, 3 hp motor, reversing motor control for tapping.



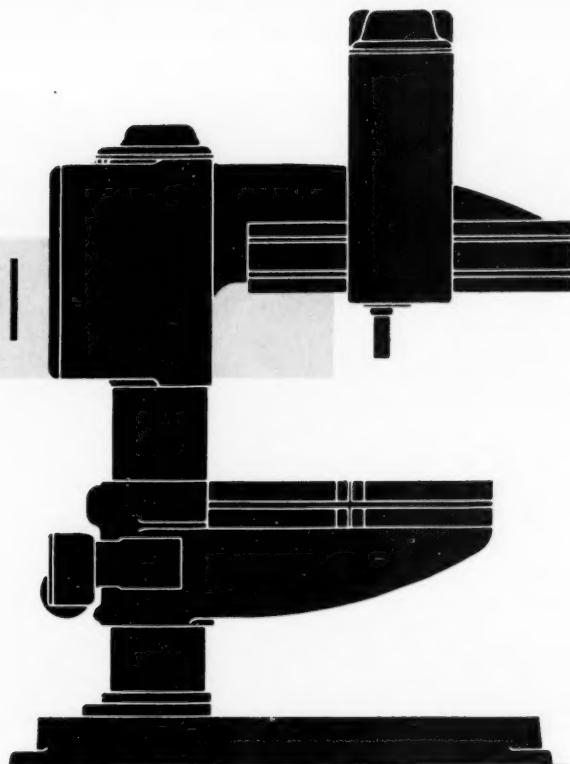
*For full information on the
Sensitive Radial, ask for Bulletin SRMS*

to give you

Variety problem solved at Lodge & Shipley

Building 46 lathe models from 14" to 60" requires plenty of production versatility. To drill and tap a broad variety of vari-shaped parts, *Fosdick's proposal* recommended the Sensitive Radial. Now Lodge & Shipley assigns tool blocks, levers, cam plates, spindle and many more complex parts to their Fosdick, knowing it will produce fast and easily. *Operation illustrated:* Tailstock spindle clamped to table vee. Drill, chamfer and tap 4 holes. 17/64" drill, 1020 rpm, .004 ipr, 7/8" deep. Chamfer, 1020 rpm. Tap 5/16" x 18 thread using Automatic Tapping Control (extra equipment), 240 rpm, 1/2" deep.

radial



versatile production like this

Need Drilling Equipment? Get a Proposal from Fosdick!



Radial Drills



Jig Borers



Sensitive and
Upright Drills



Sensitive
Radial Drills

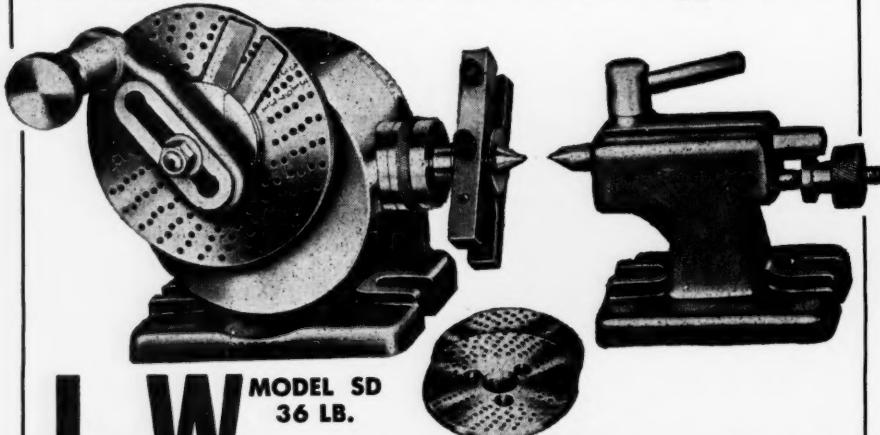


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L-W MODEL SD
36 LB.

6½" Swing DIVIDING HEAD

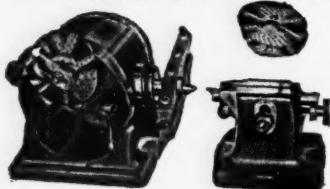
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Model BP 11" Swing for plain milling machines. \$225.00
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Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products

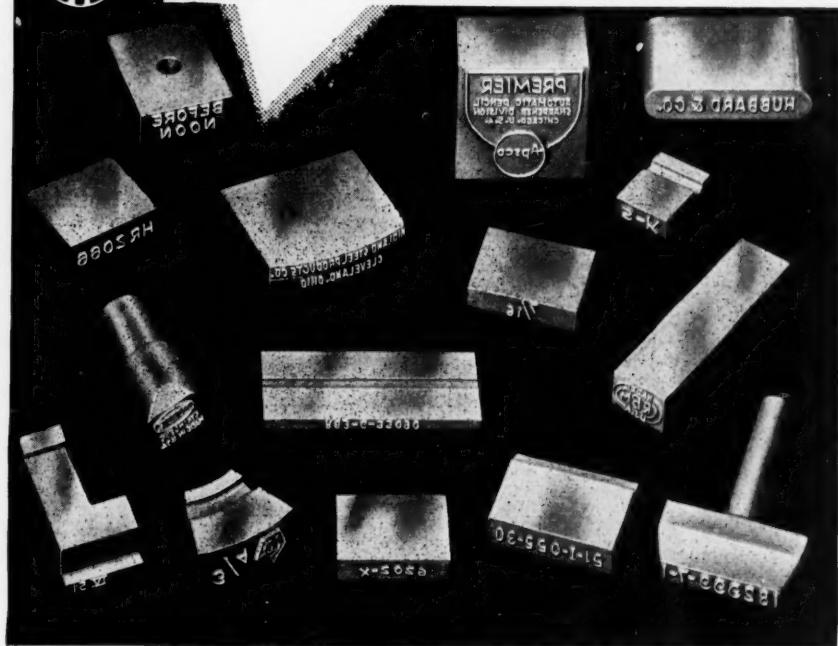


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JONES**

Precision Holding helps

**Speeds tool changes... safeguards accuracy and production
on 16-Station Automatic Transfer Machine**

When you watch V-8 cylinder blocks undergoing 379 precision operations on a battery of Greenlee Transfer Machines... 80 per hour, with unbelievable automaticity... you realize the contribution made by Scully-Jones "Precision Holding" on the business end of Greenlee spindles. To keep production flowing, tool changes are simple and fast, critical adjustments between spindle and work are accurately made.

Greenlee engineers chose Scully-Jones Drill and Tap Chucks to provide a positive, accurate drive for the cutting tools on this 16-station unit illustrated. Easy to insert and eject from the spindles, they save costly setup time. Hole distortion is eliminated... tools last indefinitely without losing accuracy.

Scully-Jones Quick-Lock Adapters and Spindle Extension Assemblies provide individual, fine adjustments for each spindle, maintain accurate depth of cut after tool sharpening.

No matter what your holding or driving problem may be, Scully-Jones "Precision Holding" will give you a better, more accurate job! See your Scully-Jones representative or stocking distributor for quick service.

STYLE "B" DRILL CHUCKS, for straight shank drills and reamers, save tool life, work to close centers, speed tool changes, give guaranteed accuracy, resist nicking and burring over a lifetime of hard service.

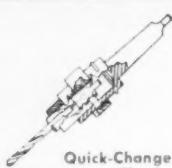
STYLE "A" TAP CHUCKS eliminate bell-mouthing and oversized tapped holes, save costly setup and down-time, work to close centers, last indefinitely under heavy loads.



Scully-Jones
Style "B"
Precision
Drill Chucks

Scully-Jones
Style "A"
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Tap Chucks

THERE'S A SCULLY-JONES PRECISION TOOL FOR EVERY HOLDING OR DRIVING NEED



Quick-Change
Chucks
Change tools in "seconds" without stopping spindle. Give positive drive.



Adjustable
Adapters
Permit accurate adjustments in cluster of spindles. Speed tool changes.



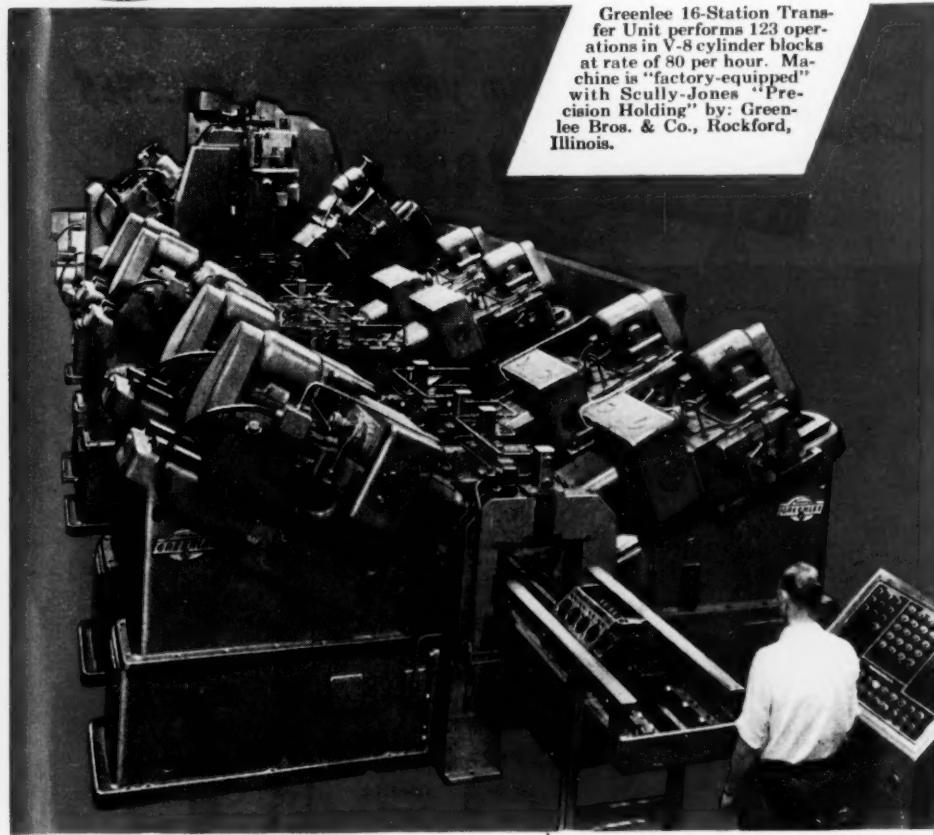
Tension and
Compression Tap Holders
Compensate for variations of feed between spindle and tap.



Pre-Setting Gauges
Height and flush pin gauges reduce setup time on multiple spindles.



"robotize" production!



Greenlee 16-Station Transfer Unit performs 123 operations in V-8 cylinder blocks at rate of 80 per hour. Machine is "factory-equipped" with Scully-Jones "Precision Holding" by: Greenlee Bros. & Co., Rockford, Illinois.

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Gentlemen: I'm interested in learning more about Scully-Jones Tools.

Please send Bulletin No. 1-50 describing Drill and Tap Chucks.
 Send catalog on your complete line.

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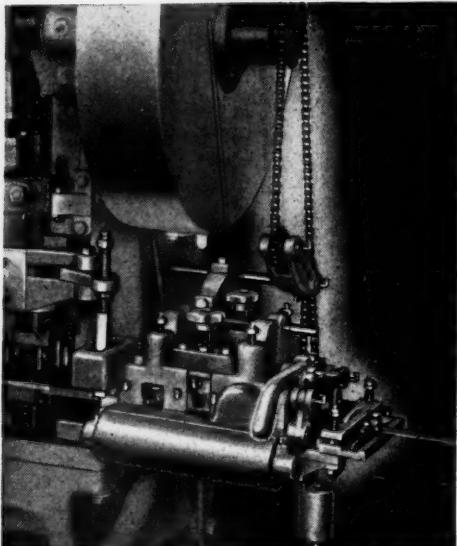


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Automatic Roll Feeds



Step up production by making your punch presses automatic! Wittek automatic roll feeds fit all makes and sizes of punch presses — provide maximum efficiency and extreme accuracy in the high-speed automatic feeding of strip stock. They are made in single roll, double roll, and compound types with straighteners, in models to feed (push or pull) in any of four directions. Length of feed is quickly and easily adjusted to meet individual job requirements.



4404

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A choice of standard models is available to facilitate handling a large variety of coiled stock... from small, light coils to those weighing up to 800 pounds. These larger reel stands automatically center the coils and provide frictional braking action to prevent overrunning and maintain uniform coil slack.

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Automatic
ROLL FEEDS AND
REEL STANDS



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Mr. Anderson . . .

... show him!

That new man in the shop, Mr. Anderson, will ask a lot of questions about taps and tapping results. But we know, and you know, that showing not telling, is the proof of "performance-ability." Show him what Hanson-Whitney taps are doing . . . point out their complete dependability in day-in, day-out production. Then, like you, he'll be sold on . . .

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The Hanson Process is the original method of finishing after hardening. Through this process, Hanson-Whitney has for 34 years produced a quality line of finished precision taps to the complete satisfaction of our customers. We have never manufactured cut thread or unfinished taps in our years of serving the metalworking industry.

Yes, Mr. Anderson, the proven performance of Hanson-Whitney taps is a matter of record. Naturally, the right tap for the specific job is essential . . . ask the Hanson-Whitney representative for recommendations.

HANSON-WHITNEY DIVISION of the WHITNEY CHAIN CO.
160 Bartholomew Avenue, Hartford, Connecticut, U. S. A.

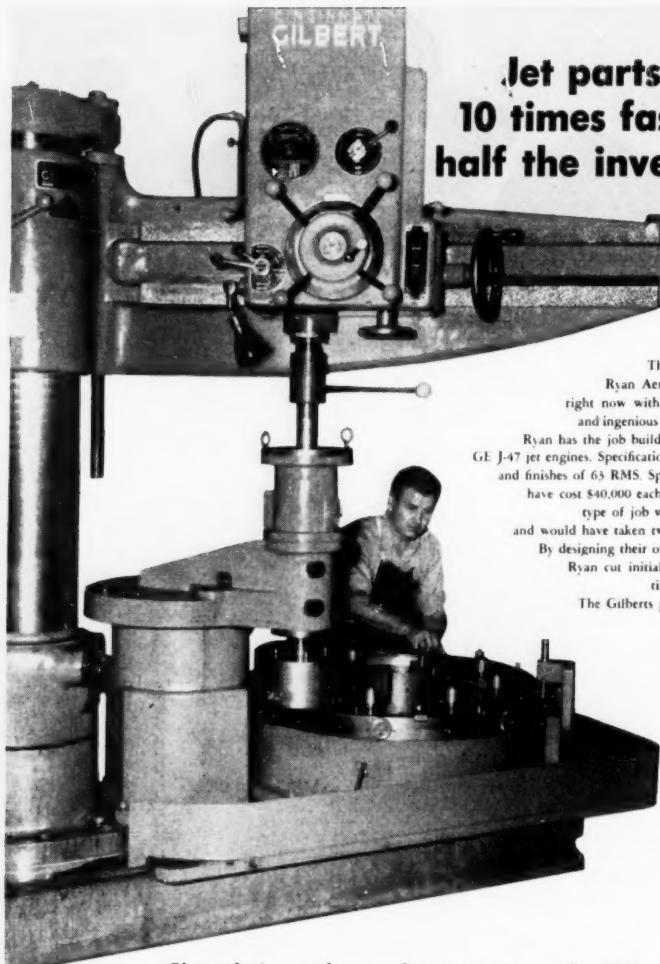
Our "Mr. Anderson" typifies the thousands of practical machinists in America. You'll find him in your shop. Ask him what he thinks about H-W taps and gages.

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SHOWCASE



Jet parts drilled 10 times faster for half the investment

That's quite a story. But it's true.

Ryan Aeronautical engineers are doing it right now with Cincinnati Gilbert radial drills and ingenious fixtures they designed themselves.

Ryan has the job building stainless steel aft frames for GE J-47 jet engines. Specifications demanded tolerances of .005" and finishes of 63 RMS. Specially-designed machines would have cost \$40,000 each. Conventional machines for this type of job would have cost equally as much, and would have taken two days to complete each frame.

By designing their own fixtures to attach to Gilberts,

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The Gilberts provide the rigidity, power, and responsive controls so vital to precision jobs.

Clean design and rugged construction make Gilberts pay high returns on your investment. Quick response to controls, with minimum effort, plus positive "no-drift" clamping, help Gilbert operators get more work done accurately and faster. 9" and 11" columns. Thirty-day delivery. Ask your Gilbert representative to demonstrate why "those who buy Gilbert buy Gilbert again," or write for Bulletin 349.

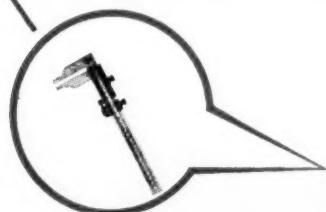
THE CINCINNATI GILBERT MACHINE TOOL COMPANY • 3366 BEEKMAN STREET, CINCINNATI 23, OHIO

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*The LONG and SHORT
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Manufactured of specially selected STAINLESS STEELS — HARDENED and NORMALIZED — ETALON CALIPERS are helping to maintain standards of accuracy in shops the world-over.

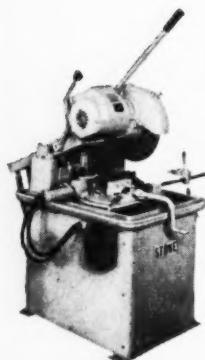
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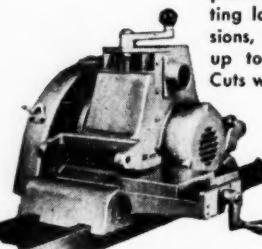
MODELS AVAILABLE
FOR ALL SHOP NEEDS

MODEL SS-20
TRAVERSE TYPE

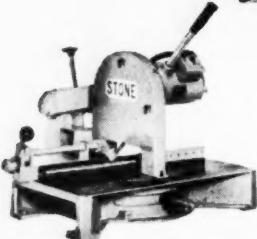
Operates in horizontal plane on guided rails for cutting larger structurals, extrusions, sheet, plate with cuts up to nine feet in length. Cuts wet or dry.

MODEL M-75
HEAVY DUTY

For continuous production cutting of solids up to 2½" — pipe and structurals up to 4". Equipped with full 7½" h.p. geared-in-head motor engineered with positive drive for 33% greater efficiency.



MODEL M-14



Low cost machine for cutting solids up to 2" — pipe and structurals up to 2½". Two models — straight cut-off and swivel head for angle cutting to 45°. Bench or floor model. Equipped with full 3½ h.p. geared-in-head motor engineered with positive drive.



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Complete
Information
On These Machines



Holes, Contours, Surfaces

Published in the interests of greater accuracy and quality in the toolroom and on the production line by the Moore Special Tool Company, Inc., 730 Union Avenue, Bridgeport 7, Conn., builders of Jig Borers, Jig Grinders, Panto-Crush Wheel Dressers, Die Flippers, Motorized Centers and a complete line of Hole Location Accessories.

ACHIEVING PERMANENCE OF ACCURACY

Just as important as the initial accuracy of a precision machine tool is the *life expectancy* of this accuracy. And the most effective way to insure long-lasting accuracy is to give *dimensional stability* and *wear resistance* special consideration during machine design.

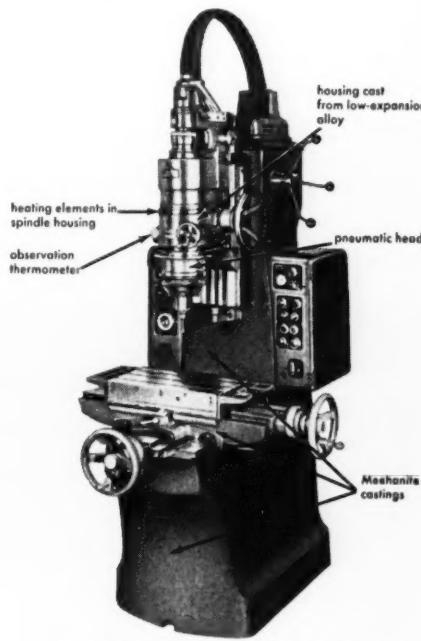
The following causes of dimensional instability are most frequently encountered: thermal expansion, unstable constituents in the material; and stresses in the material. In the design of the No. 2 Moore Jig Grinder, all of these factors were taken into account and special features were incorporated to counteract them.

All the inherent accuracy of a measuring system, capable of positioning the workpiece in relation to the spindle within a tenth, is rendered nearly valueless if the spindle does not retain its position during machining operations. Such movement, caused by thermal expansion, is inevitable unless steps are taken during design to minimize or prevent it.

Electric heating elements were incorporated in the main spindle housing of the Moore Jig Grinder to maintain uniform temperature—whether machine is running or not. An observation thermometer is located so as to indicate any abnormal temperature change within the housing. The housing itself is cast from 36% nickel iron to further minimize effects of temperature variations. And a pneumatic head directs air onto the workpiece, preventing undue temperature rise both in the workpiece and in the locating members of the machine.

Instability resulting from gradual relaxation of locked-in stresses in castings is prevented by suitable stress-relieving cycles during the manufacture of Moore machine components. Similarly, the best way to avoid unstable hardened steel parts is by tempering them. Moore follows this practice.

Further wear resistance was built into the Moore Jig Grinder by means of: adequate way and bearing surface, scientifically proportioned to minimize and distribute wear; all reciprocating parts of nitrided steel—almost as wear-resistant as carbide; pressure lubrication of ways; lead screws and nuts made from nitrided steel and aluminum bronze, respectively, combining to offer low coefficient of friction, abrasion resistance and hardness; and dust protection devices.



Special design features of the No. 2 Moore Jig Grinder insure permanence of accuracy.

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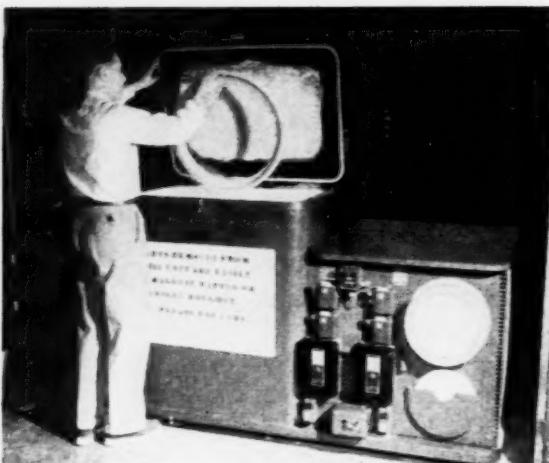
Six Sub-Zero industrial freezers are currently in use at A. V. Roe. High speed steel cutting tools are chilled to -120°F as part of the heat treating process to produce greater hardness and strength and improved ductility. All types of gauges—snap, plug and profile—are Sub-Zeroed for stability to eliminate growth and distortion.

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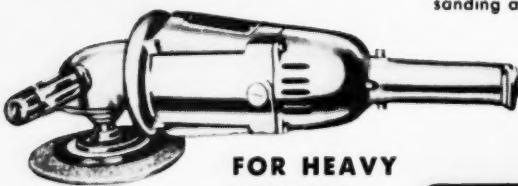
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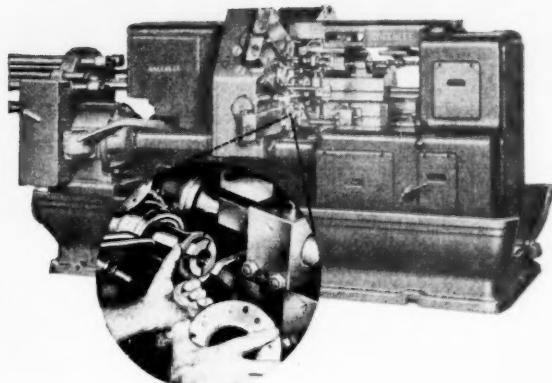
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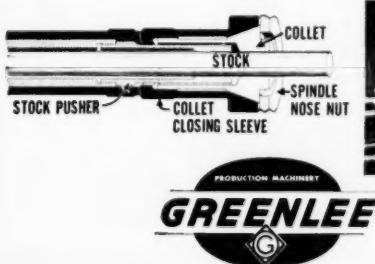
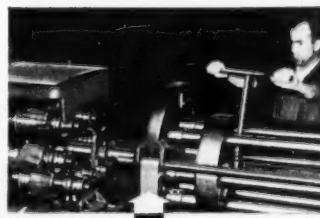
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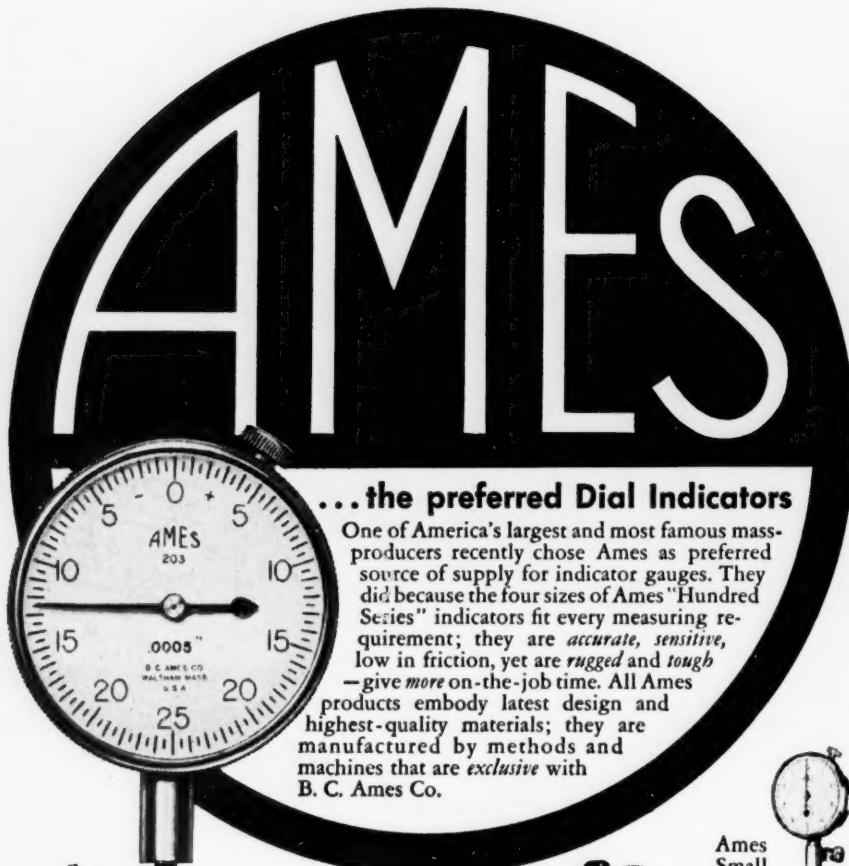
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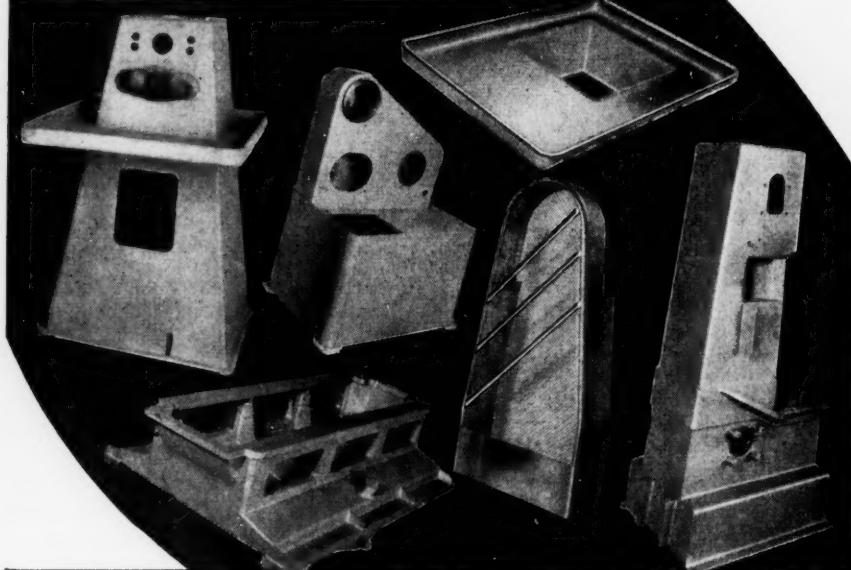
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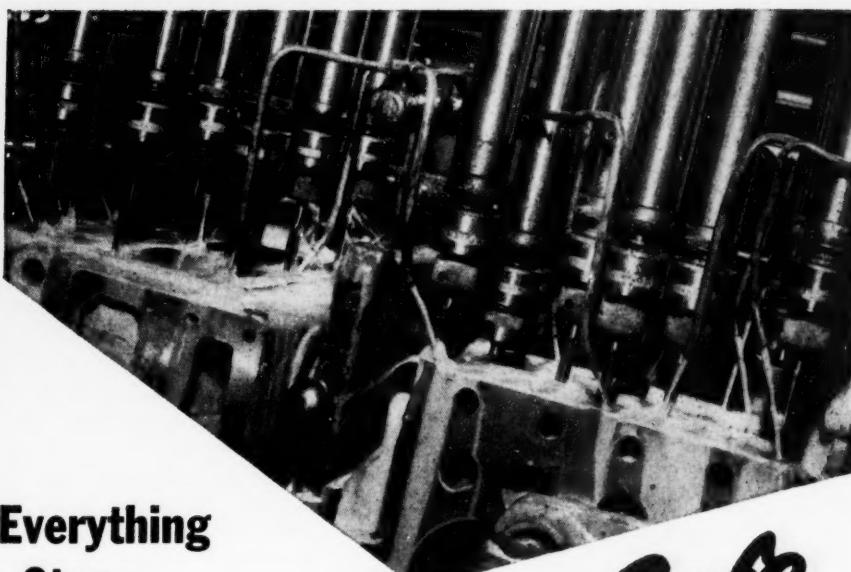
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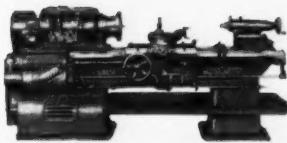


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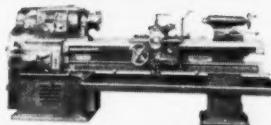


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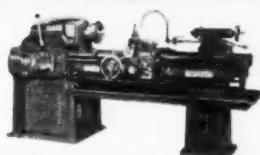
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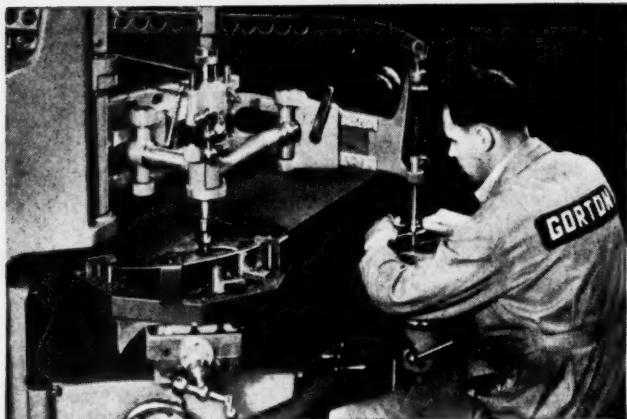
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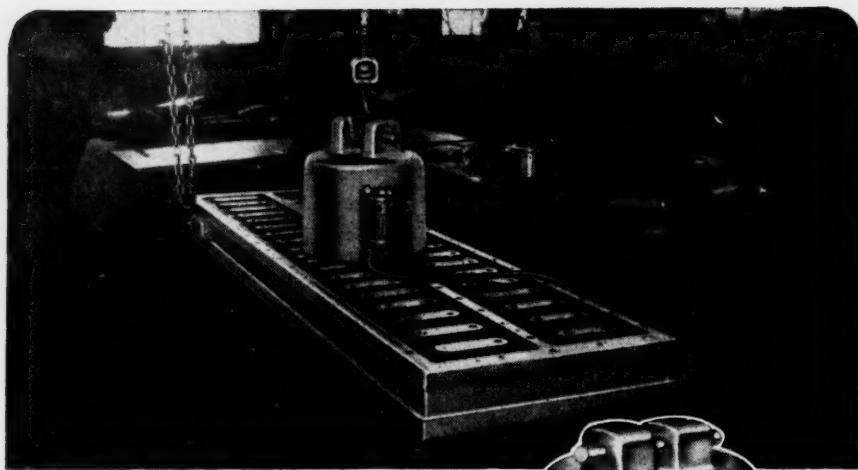


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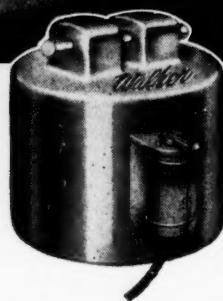
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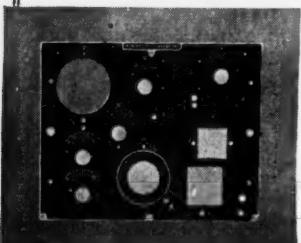
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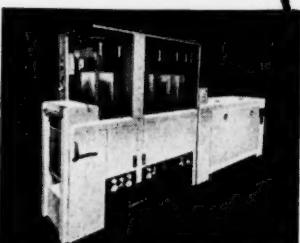


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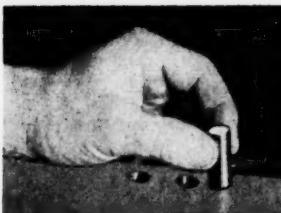


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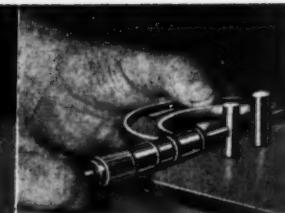
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Check hole sizes



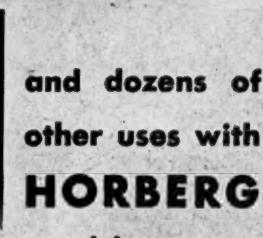
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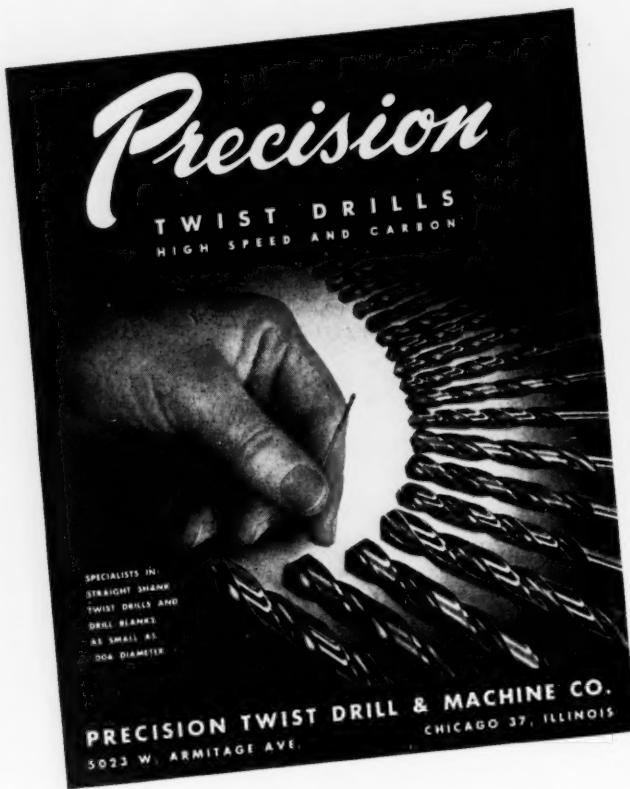
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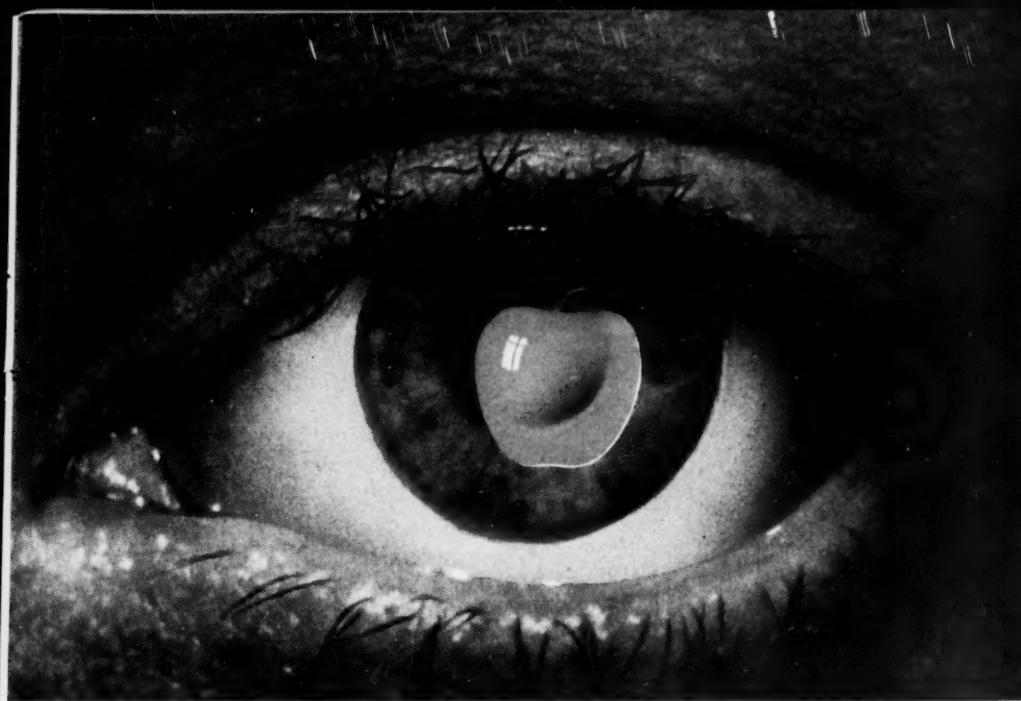
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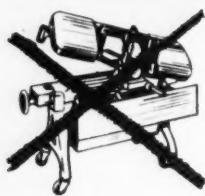
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"I Doubled Production and Increased Accuracy with my CLAUSING LATHES"



CLAUSING 6300 12" HEAVY DUTY PRECISION LATHE

The Clausing 6300 Series has every advanced feature that contributes to machining speed and efficiency. 1" collet capacity — 1 $\frac{3}{8}$ " bore — forged steel spindle with tapered, key-lock nose — Timken tapered roller bearings — quick change gears — heavy duty bed. 8 speeds, 50 to 1300 RPM. 12 $\frac{3}{4}$ " swing over bed, 7 $\frac{1}{2}$ " over saddle. 24"-36"-48" between centers. See the Clausing 6300 at your Atlas-Clausing distributor's.

CLAUSING DIVISION

ATLAS PRESS COMPANY, 10110 N. PITCHER ST., KALAMAZOO, MICHIGAN

LATHES • DRILL PRESSES • SHAPERS • MILLING MACHINES

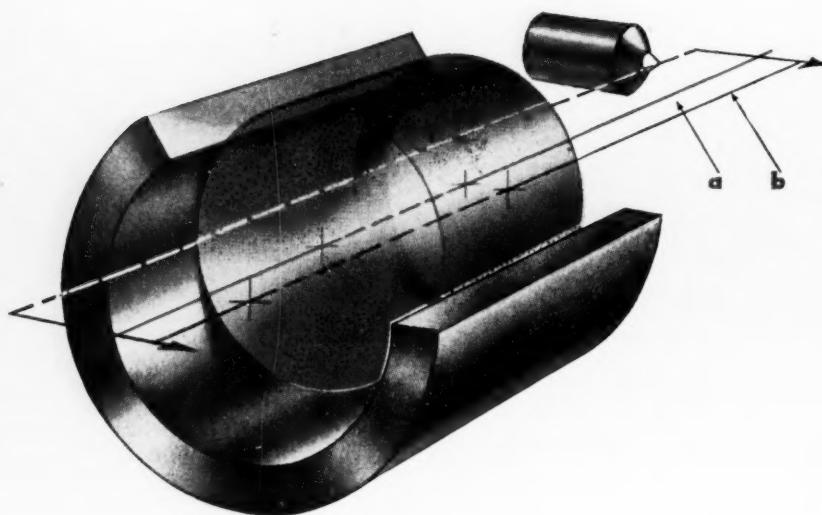
"I turn extension shafts .001 under $\frac{3}{16}$ " for 1 $\frac{1}{2}$ " with a .00001 tolerance. The diameter must be .1865 for the full length. It's easy to maintain this accuracy with my Clausing and I can't do it with other lathes. I doubled production and increased accuracy with my Clausing Lathes." — James H. Sawyer.



**Send for Catalog
TODAY!**

alignment

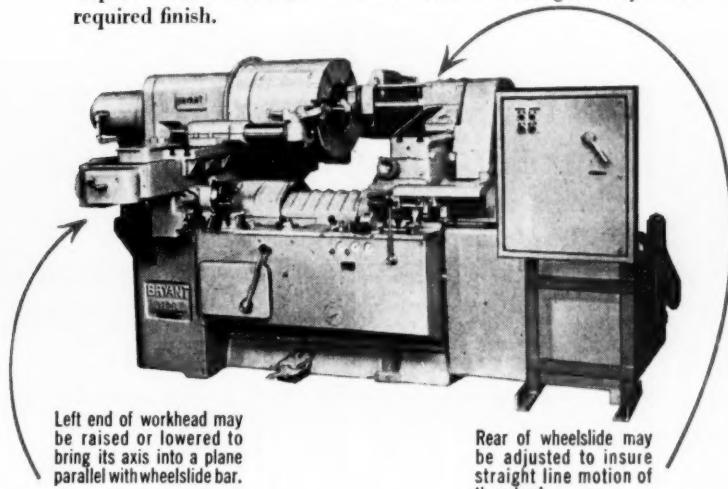
for better internal grinding



THE heart of the internal grinding process is the line of contact between the wheel and the work. This contact line must be straight for the full length of the wheel and the full length of work as the wheel traverses. If the contact is not a straight line, the internal grinder is "out of line". Improper alignment may show up in the work as incorrect hole geometry (bell-mouth or taper) and poor surface finish. In addition, excessive wheel wear and poor wheel action may result.

Several elements contribute to the straightness of this line of contact: first, the path along which the wheel is traversed "a" must be a straight line; second, the axis of the wheel must lie in a plane parallel to the wheel path "a", and third, the axis of the work "b" must be parallel to the wheel path "a". For production grinding, the diamond must lie in the plane established by the wheel axis and the work axis.

Perfect alignment means that the slides must be straight and true, the wheel and work spindles must be in line and "zeroed" for center heights and the diamond must be on "dead center" of the wheel. A full, straight line of contact will extend wheel life, improve wheel action, and will assure correct geometry and required finish.



Left end of workhead may be raised or lowered to bring its axis into a plane parallel with wheelslide bar.

Rear of wheelslide may be adjusted to insure straight line motion of the wheel.

This heavy-duty, semiautomatic machine, with hydraulic controls, has a 26" swing and will grind holes with a maximum depth of 12". Although designed for large, heavy work, a selection of wheelheads is available to grind holes as small as 1" in diameter. The extremely rugged bed provides the strength and rigidity necessary for vibrationless operation. The workhead has two positions, one for grinding and a forward position for ease in loading and checking large work. The wheelhead is adjustable to grind work up to 15° included angle. The Bryant workhead and wheelhead slides are anti-friction to provide extremely accurate grinding and sensitive control.

Write for "Alignment" booklet which gives complete details on this interesting subject. Also ask for booking form on new sound, color movie — free showings arranged for engineering groups.

Bryant Chucking Grinder Company
Springfield, Vermont, U. S. A.

Internal Grinders • Internal & External Thread Gages • Granite Surface Plates • Boring Machines



Yes, We Can Prove It!

You too, can get
High Speed Action on
your assembly jobs-

Greater Accuracy • Far Lower Cost!

by Using these Modern Mechanical Helpers
DETROIT POWER SCREWDRIVERS
and **Motorized HOPPER UNITS**

These popular, advanced machines offer a fast, dependable method of assembly definitely proved indispensable in other plants . . . In replacing slow, tedious manual handling, it has boosted production substantially, sustaining uniform results by eliminating human error . . . Whatever your feeding and assembling operations may be, our engineering experts will analyze your problem and come up with a practical solution . . . Give us details . . . Send sample assembly.



DETROIT POWER SCREWDRIVER CO.

2807 W. FORT ST.

DETROIT 16, MICHIGAN

STEP-UP Your Light Precision Machining with LIGHT TEN LATHES

Here is a whole series of small lathes designed and built to do your light precision machining. All have the same sturdy construction, the same convenience and ease of operation. Send for complete catalog and select the lathe which exactly suits your needs.

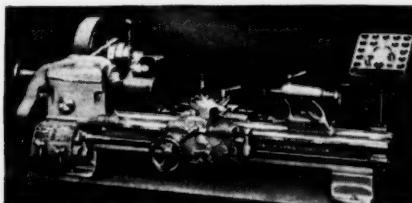
SPECIFICATIONS

Swing — 10" over bed
Collet Capacity — 5/8" max.
Spindle Bore — 27/32"
Distances Between Centers
 16 1/8" to 34 1/8" max.
Spindle Speeds (approx.)
 12-speed drives — 48 to 1435 r.p.m.
 16-speed drives — 52 to 1365 r.p.m.

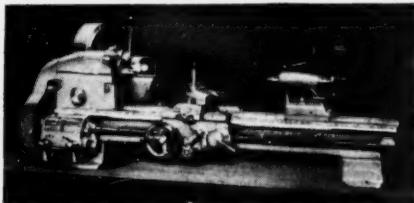
Power Longitudinal Feeds
 Toolroom and Model A —
 48, .0015" to .0853". Model
 B — 26, .0021" to .0155".
 Model C — 14, .0021" to
 .0156".
Power Cross Feeds
 Toolroom and Model A —
 48, .0004" to .0255". Model
 B — 23, .0009" to .0046".
 Model C — manual



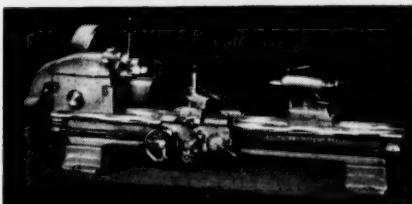
Light Ten Floor Lathe — Model A
 Quick Change Gears — Universal Apron



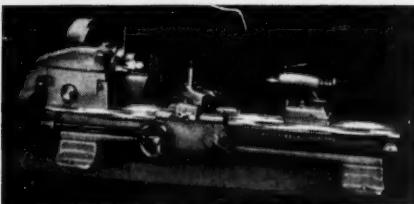
Light Ten Toolroom Precision Bench Lathe
 Includes usual toolroom attachments



Light Ten Bench Lathe — Model A
 Quick Change Gears — Universal Apron



Light Ten Bench Lathe — Model B
 Independent Change Gears — Universal Apron



Light Ten Bench Lathe — Model C
 Independent Change Gears — Plain Apron



Yes, you can get most any South Bend product immediately from our distributor's stock in principal cities. Items not stocked, shipped promptly from factory.

Three ways to order:

1. See or telephone nearest distributor.
2. Order by mail from your distributor.
3. If no distributor is nearby, order direct from factory.

South Bend machine tools with accessories may be purchased on convenient terms up to 12 months.

SEND INFORMATION CHECKED:

<input type="checkbox"/> 9" and 10" BENCH LATHES	<input type="checkbox"/> 10" to 16-24" FLOOR LATHES	<input type="checkbox"/> DRILL PRESSES	<input type="checkbox"/> TOOL GRINDERS	<input type="checkbox"/> 1/2" & 1" Collet TURRET LATHES	<input type="checkbox"/> 7" BENCH SHAPERS
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Name _____ Company _____

Street _____ City & State _____



Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana

GOT A TOUGH CENTERLESS GRINDING PROBLEM

HERE'S THE GRINDING WHEEL THAT WILL ABSOLUTELY SOLVE IT!

CINCINNATI Grinding Wheels are made to team-up with centerless grinders for the smartest solutions to industry's toughest grinding problems. And with a Cincinnati Milling-trained machinist on the spot to help you get the most out of CINCINNATI Grinding Wheels, you can count on the *right answer—FAST!*

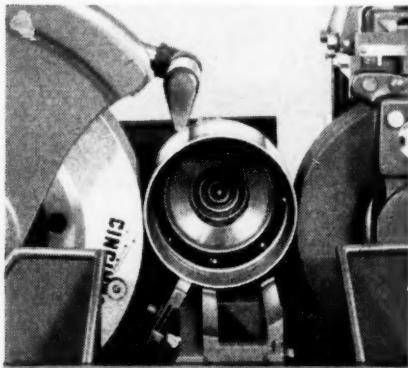
CINCINNATI Grinding Wheels are used by—and *developed* by—Cincinnati Milling, which has done more research, had more experience and made more centerless grinders than any other organization in the world.



CINCINNATI Grinding Wheels have solved hundreds of centerless grinding problems involving finish, roundness, taper, sizing and production.

2 Using CINCINNATI Wheels, we've solved hundreds of centerless grinding problems—such as finish, roundness, taper, sizing and production.

3 CINCINNATI Grinding Wheels represent 25 years of Cincinnati Milling research and practical experience based on an entirely new approach to grinding wheels—the development of the grinding wheel as a true cutting tool.



Here's a tough one! Large volume of metal to be removed, involving high heat, while holding close tolerances on a large part easily distorted by pressure. (See Case History at right.)

We are so sure that CINCINNATI Grinding Wheels can help solve your tough centerless grinding problem that we make this *unconditional offer*—either you must be completely satisfied, or we will make no charge for the CINCINNATI Grinding Wheel used.

How CINCINNATI Grinding Wheels Solved Tough Grinding Problem



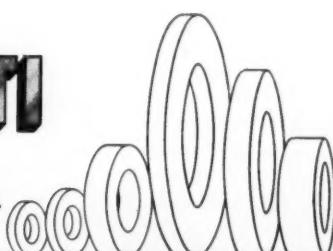
The job	Diesel Engine Piston, 8 $\frac{1}{2}$ " Dia. x 7" long x 3/16" wall, alloy cast iron, 217-300 Brinell. Stock removal .010-.015". Tolerances - straight and round .002"; finish 20-50 RMS. To be ground in one pass.
The machine	Cincinnati No. 3 Centerless (altered).
The problem	Close tolerances to be held on a large part that is easily distorted by pressure. Large volume of metal to be removed (about 1 $\frac{1}{2}$ cu. in.) involving high heat.
The solution	Close collaboration between production men, machine tool men and grinding wheel men resulted in a notable solution to a difficult job. Tolerances are successfully held. Grinding time, under shop conditions, is 1.1 minutes per piston. Six pistons are ground between dressings.

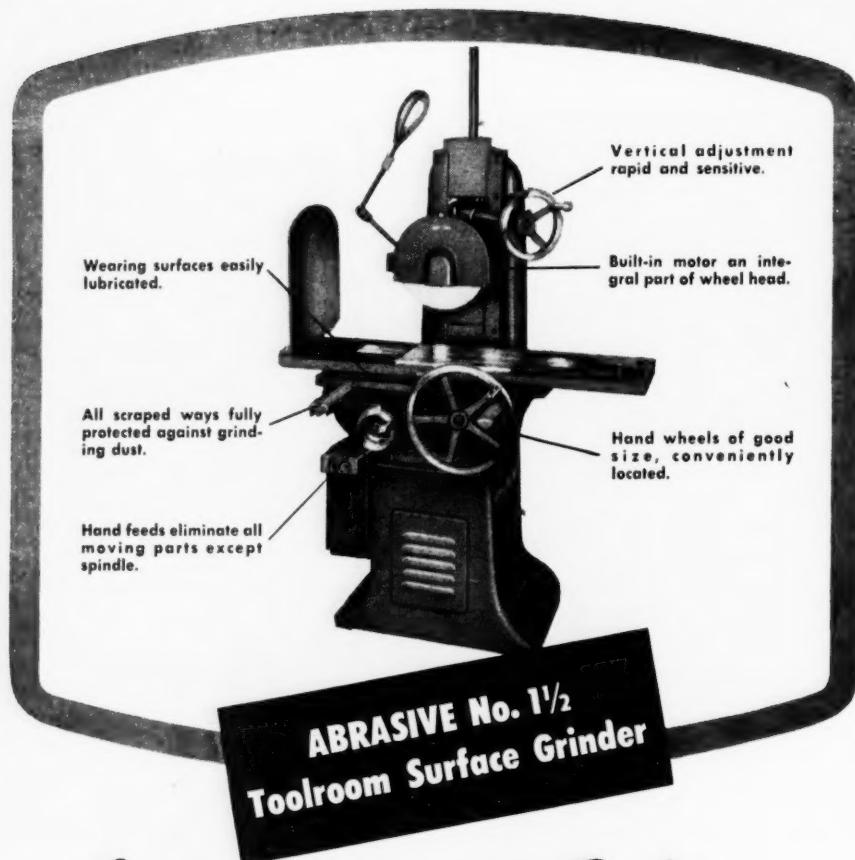
The wheel is a Cincinnati 4440-I-W, regular aluminum oxide instead of the more conventional silicon carbide. It not only costs less but reduces diamond wear which is important, considering the width of the wheel (13") and the close tolerance for taper.

If you have a tough centerless grinding problem, contact us at once. We'll send one of our expert machinists—men who are Cincinnati Milling-trained and know grinding and grinding machines as well as grinding wheels. He can show you how to get the most out of CINCINNATI Grinding Wheels and help you solve that tough centerless grinding problem. There is no charge for his service. Write, wire or phone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

CINCINNATI
Grinding Wheels

THE CINCINNATI MILLING MACHINE CO.
Cincinnati 9, Ohio





Little Grinder with Big Ideas

Give your toolmakers the grinder that's big enough for most toolroom jobs. Abrasive No. 1 1/2 takes work up to 15" long x 10" wide x 12" high — 150 sq. in. of table working surface! Nearly 50% more than most small surface grinders. Work produced on this grinder satisfies every requirement for accuracy, fine finish, and flatness. This is a

precision tool of extremely simple design — a popular tool wherever one-of-a-kind jobs have to be ground fast, efficiently, and with a minimum of fuss and bother. Send for catalog describing Abrasive No. 1 1/2 Surface Grinder. Abrasive Machine Tool Company, 20 Dunellen Road, East Providence 14, Rhode Island.

ABRASIVE

ACCURACY BOOSTS PRODUCTION

Abrasive Quality is Reflected in the Finish of Your Product



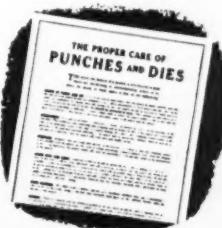
In stock 400 sizes of 21 standard CLEVELAND PUNCHES!

For your convenience we carry 400 sizes of our 21 standard punches and matching dies in stock. Punching diameters range from $\frac{5}{32}$ " to $1\frac{1}{2}$ ". You will get prompt shipment of any standard punch. Special sizes or shapes will be made to your specifications.

Don't overlook the savings offered by the Cleveland system of standardization. You can punch any size hole from $\frac{1}{8}$ " to $1\frac{1}{16}$ " by using the same coupling nut and punch stem.

Are you obtaining maximum service from your Punches and Dies? Protect tool life—send for copies of our two-color wall instruction chart, "Proper Care of Punches and Dies."

A-5189





Aesop's Fable of

"The Eagle and the Crow"

**carries a moral for
Cutting Fluid users**

The Fable . . .

→ **A** Crow, sitting on a fence post, watched a huge Eagle swoop down on a luckless lamb and carry it away. "That looks easy," thought the Crow, and straightaway tried to duplicate the Eagle's feat. Of course, he couldn't lift the lamb and, instead, got tangled up in its wool and couldn't get loose. The farmer came over, grabbed the Crow, and wrung its foolish neck.

The Moral . . . Just as there was a big difference in abilities of the Eagle and the Crow in the fable, so are there big differences in the abilities of different types of cutting fluids. Stuart Oil Co. does not attempt to apply a watermixed cutting fluid where a straight oil is needed, or vice versa. Some applications require a fluid with great lubricity, or high *anti-weld* properties. All require *temperature regulation*, but always *more than a "coolant" is needed*.

Let your Stuart Representative demonstrate the opportunities for increased machining efficiency in your plant. Ask to have him call at your convenience.

D.A. Stuart Oil co.
EST. 1865 LIMITED

TIME-TESTED CUTTING FLUIDS AND LUBRICANTS

2741-47 S. Troy St., Chicago 23, Ill.

**More Than a
"Coolant"
is Needed**



Cuts burr removal time 50% ... greatly improves quality

Power Brushing of transmission gears removes burrs and blends surface junctures automatically. It has paid off 5 ways for a large East Coast manufacturer of aircraft parts.

Their Osborn Brushing Machine produces a uniform required rounding of .030" to .090". It accommodates gears and splines of most types, internal and external. It is easy to adjust for small gear lots and production runs of from 15 to 5,000 pieces. It eliminates costly scrap. And less effective hand method time was cut almost 50%.

Production bottlenecks and ineffective finishing departments in your plant can be reduced, often eliminated, with Osborn Power Brushing methods.

Find out how you can cut *your* costs . . . improve your workmanship. For new bulletin, Automatic Deburring, call in your nearby Osborn Brushing Analyst for complete information, or write *The Osborn Manufacturing Company, Dept. P-6, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

SEE THIS BRUSHING METHOD DEMONSTRATED AT METAL SHOW—BOOTH 1030

October, 1953



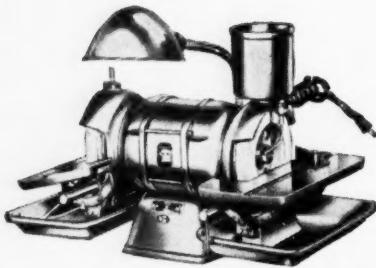
Operator can set up in a few minutes. Work is power rotated against the face of the brushes. A pre-set timer controls length of the cycle and retracts the holder.



Old method of hand burr removal was inaccurate, costly and time-wasting.

Baldor

BALL-BEARING GRINDERS



Clip this ad and mail for bulletins on
Carbide Tool Grinder.

NEW BALDOR W-I-D-E CLEARANCE GRINDER

Baldor is a basic manufacturer of Grinders—even the motors are built by Baldor. The new streamlined grinder, 8200 series, is excellent for grinding long and odd-shaped pieces as there's plenty of clearance between the wheels and the motor frame. $\frac{1}{2}$ hp, 3450 RPM, capacitor-start, capacitor-run motor GUARANTEED 2 years against burnout. Baldor makes a complete line of 6"-12" general purpose bench and pedestal grinders. Complete price as shown.

\$89.50

CARBIDE TOOL GRINDER FOR PRECISION WORK

The $\frac{1}{2}$ hp motor that powers this Baldor Carbide Tool Grinder has no commutator, no centrifugal switch, no brushes—a really trouble-free motor that will not burn out even when overloaded repeatedly. Electronically balanced within 1/50 ounce of perfection, the armature rotates at 3450 RPM without vibration—an engineering achievement that makes true precision work possible. Complete price, as shown.

\$149.20



Note exhaust type guards.
Ask for Bulletin 321-H

BALDOR ELECTRIC COMPANY

4380 Duncan Avenue

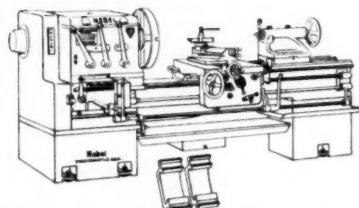
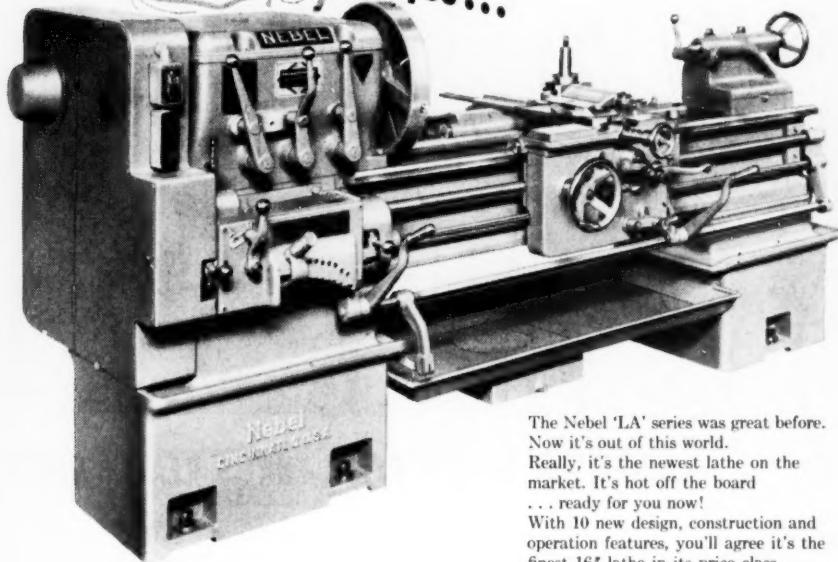
•

St. Louis 10, Missouri



right off the board to you...

16"
THE NEBEL
MODIFIED 'LA' SERIES
MEDIUM DUTY LATHE



Wide, deep gap presents additional swing capacity . . . has all the advantages of the 16" Modified 'LA' engine lathe.

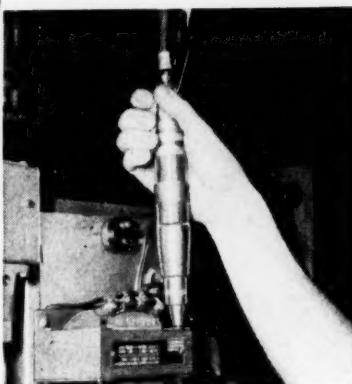
The Nebel 'LA' series was great before. Now it's out of this world. Really, it's the newest lathe on the market. It's hot off the board . . . ready for you now! With 10 new design, construction and operation features, you'll agree it's the finest 16" lathe in its price class. Also available in Nebel's famous double-duty removable block gap model. For complete information, write The Nebel Machine Tool Co., Cincinnati 25, Ohio.

Nebel

Workhorse of the
Metalworking Industry since 1899



Quick cure for a production line headache



-A NEW AIR SCREWDRIVER THAT'S REALLY QUIET

Replace your present screwdrivers with Chicago Pneumatic's new CP-3008. Its supersonic exhaust feature changes sound waves to a frequency which approaches the limit of human hearing.

The CP-3008 weighs only 1 lb., 14 oz. . . . has a side outlet exhaust deflector that rotates and locks for

directional exhaust. Built-in speed control assures precision speed increases and decreases. Available with many accessories, the CP-3008 has a rated range of #4, #6 and #8 screws but in some cases can be used on #2's and #10's. Write for Bulletin SP-3096. *Chicago Pneumatic Tool Co., 8 East 44th St., New York 17, N. Y.*



Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

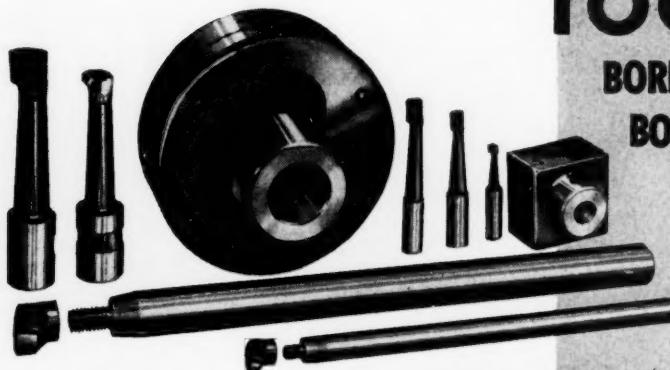
for more *Accurate* cuts...

greater *Rigidity* in

BORING TOOLS

BORING HEADS

BORING BARS



Use CRITERION BORING EQUIPMENT

BORING PROBLEMS? CLOSE TOLERANCE?

Try Criterion Boring Tools. Built with the same care and quality as the time-tested Criterion Boring Head.

THIS COMBINATION WILL PRODUCE RESULTS.

Boring heads from 1½ to 7 inch diameter. Boring tools, carbide or high speed steel, ½ to 1¼ inches diameter. Bore holes from ½ to 20 inch diameter.

Accuracy for the closest tolerance • Rigidity for the heavy cuts • Heat-treated parts for long wear

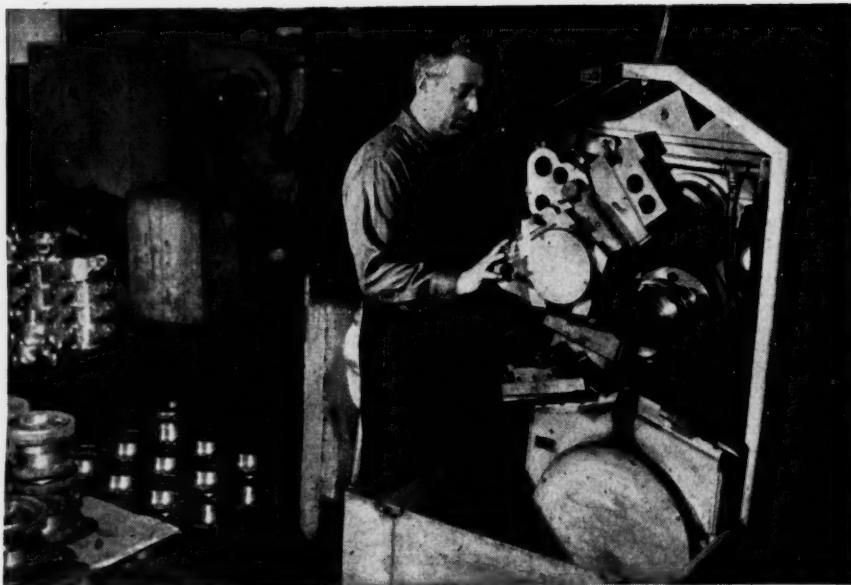
LARGE OFFSET SAVES TIME AND TOOL CHANGES

These tools will cut your boring costs.

See the complete line of CRITERION TOOL PRODUCTS at your local dealers or write for free catalog.

**CRITERION
MACHINE WORKS**

9312 SANTA MONICA BLVD • BEVERLY HILLS, CALIF.



When Precision was the Pay-Off!

HALEY MACHINE CO., Springfield, Ohio, recently installed a Warner & Swasey 1 AC Single Spindle Automatic Chucking Machine to turn vital, high-precision hydraulic pump parts for U.S. Army tanks. The job called for extreme accuracy, because these pumps are filled under pressure with an anti-freeze that has a tendency to leak where water will not.

To avoid leakage these extremely close tolerances had to be held—40 to 63 micro-inch finish on surface finishes, .002" on forming, .0008" to .001" on turning, and .001" in concentricity. Maintaining such accuracy with previous methods was difficult—scrap loss was too high.

Production had to be speeded up.

The Warner & Swasey Automatic took the function of holding these close tolerances out of the operator's hands—substituting the automatic operation of this high-precision machine for the job. Production was doubled—in some cases tripled! Scrap loss was reduced 12 to 15%!

This type of consistent accuracy is just not possible by manual methods due to the human error of even the best machinists. It is even unusual for an automatic. But the Warner & Swasey 1 AC has the rigidity, the *built-in* accuracy, plus the ability to repeat accurate settings to handle the *most difficult* jobs!

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY

**Dull
tools
cost
you
money!**



The sharpness and efficiency of production tools materially affect your production costs — and profits. Because they meet such exacting requirements, Grand Rapids Universal Cutter and Tool Grinders have won industrial acceptance the world over. Models No. 10 and No. 12 are available for delivery upon short notice. Available for later delivery are larger Hydraulic Feed Universal and Tool Grinders. Write today for full data on models to meet your requirements.

GALLMEYER & LIVINGSTON CO.
308 Straight Ave., Grand Rapids, Mich.

**GRAND RAPIDS
GRINDERS**

MANUFACTURERS OF SURFACE GRINDERS, CUTTER
AND TOOL GRINDERS, TAP AND DRILL GRINDERS.





Why are flexible shaft driven tools so popular?



* The answer is their amazing versatility... the variety of jobs they'll perform... their ability to work in hard-to-get-at spots... their light weight and easy maneuverability.

It's the flexible shaft that does it. In fact, no other method of transmitting power could possibly provide the same adaptability, flexibility and wide operating range *at so little cost*.

It pays to consider flexible shaft drives for *any* machinery, either as an integral part of the equipment or as attachments. Chances are, they'll make possible important design improvements with consequent savings in manufacturing, assembly and operating costs.

S.S.White engineers will be glad to cooperate with you in working out details of any application. For further information...

WRITE FOR THE FLEXIBLE SHAFT HANDBOOK

It has full details on flexible shaft selection and application. Copy sent free if requested on your business letterhead.

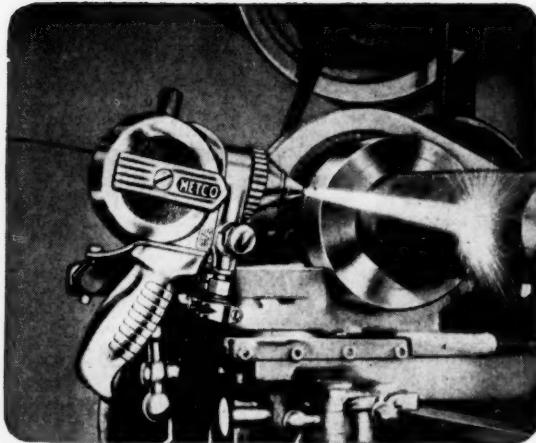


THE *S.S.White* INDUSTRIAL DIVISION
DENTAL MFG. CO.



Dept. 5, 10 East 40th St.
NEW YORK 16, N. Y.

Western District Office • Times Building, Long Beach, California



Metallizing damaged journals on turbine shaft



Building up worn brake-drum



Metallizing protective coating on steel plate

New, low, compressed-air requirements . . . only 10 cfm at 40 to 60 psi, already available in many shops, or supplied by inexpensive 3 hp compressor . . . bring metallizing within reach of the small user.

Here's a chance for the smaller maintenance shop to get into profitable metallizing operations like these:

- Save up to 90% of replacement costs on machine repair jobs,
- Do your own hard-facing,
- Apply long-wearing corrosion-resistant coatings to exterior plant structures, tanks and other equipment.

Sprays 23 Different Metallizing Wires—With the new L-Gun you can spray .10, .25, .80 carbon steels, stainless, babbitts, brass, bronze, nickel, aluminum, tin, zinc, special hard-facing materials such as Metco-Weld H, and the new self-bonding Sprabond wire.

It's Versatile—Use the L-Gun machine-mounted or hand-held—it weighs only 4 lb. 2 oz. Do all kinds of metallizing work—shaft and bore build-up with harder, longer wearing metals; build up worn pump plungers, crankshafts, motor shafts; apply corrosion-resistant coatings. There are hundreds of different jobs that are "naturals" for metallizing.*

Some High Quality as Other Metco Guns—The low air requirements of the new L-Gun have been achieved without any

**now
a really
low-cost
metallizing
installation...
with the new
Metco L-Gun**

sacrifice in Metco quality. It embodies new developments in turbine and nozzle construction—it's built, like all Metco guns, for rugged, dependable service.

A Real Opportunity for the Smaller Shop—Thousands of large, well-known companies have been metallizing users for many years, not only in maintenance but in production applications on original equipment. Now, with the development of the new L-Gun, and a low cost installation, metallizing is within the reach of even the smallest plant. (We'll be glad to send you the names of some Metco users—large and small.)

Free Bulletin or Shop Demonstration—Send off the coupon for the detailed information Bulletin 55 gives you. Or, better still, ask for a demonstration in your own shop by a Metco Field Engineer. He'll be glad to show you how the new Metco L-Gun works on some job of your own. No obligation, of course.



Don B. Watson

METALLIZING ENGINEERING CO., INC.
38-14 30th Street, Long Island City, New York

Please send me more information about metallizing.
 Please arrange a demonstration in my shop.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

See other examples of metallizing illustrated in our 8-page Bulletin in your Sweet's Plant Engineering File—Section 7a/Me.

The following names are the property of Metallizing Engineering Co., Inc.

METCO • Sprabond wire • Metco-Weld

IREG U.S. PAT OFF

METALLIZING ENGINEERING CO., INC.

38-14 30th STREET



LONG ISLAND CITY 1, N. Y.

In Great Britain: METALLIZING EQUIPMENT COMPANY LTD., Chobham near Woking, England

NEW-3-DIMENSIONAL! *Turchan* HYDRO-ROUTER

- SERVO-CONTROLLED
- FAST, ACCURATE
- SIMPLIFIES COMPLEX
MILLING and ROUTING



Greater sensitivity, accuracy and increased duplicating speed result in hours of costly time saved on dies, forms and moulds with Turchan's new Hydro-Router. Controls are grouped in easy reach of operator; virtually eliminating fatigue. Infinitely variable automatic tracer-controls produce a superior finish. Turchan Hydro-Router available in many sizes; each with a wide range of speeds and feeds.

Turchan
has what industry
needs in the trend to
Automation

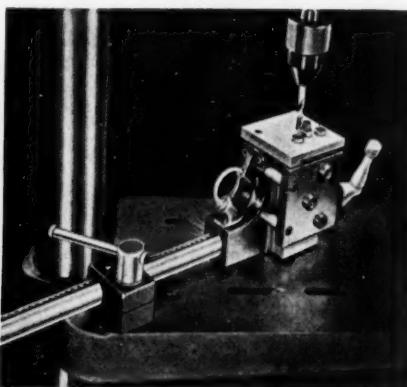
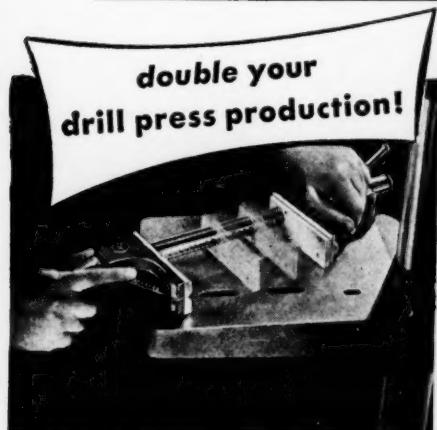
WRITE FOR FULL INFORMATION

Turchan FOLLOWER MACHINE CO.

Machine Tools Division, 8259 Livernois Avenue, Detroit 4, Michigan

For 20 years, designers and builders of automatic hydraulic tracer-controlled equipment for standard machine tools and special machines

NEW AMF Float-Lock Instant-Change Safety Vise



IDEAL BASE FOR DRILL JIGS

Retaining its full-floating and locking features, but otherwise completely redesigned, the new AMF Float-Lock *Instant-Change* Safety Vise is faster, huskier, greater in capacity (9" and 12" jaw openings)... the most versatile, most economical work holder yet devised for drill presses!

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7	32-40	5/8	12-14-16-20-24-27-28- 32-36-40	1-13/16	8-10-12-14-16-18-20
8	24-30-36-38-40-44-48	11/16	11-16-18-20-24-27-28- 30-32	1-15/16	8-10-12-14-16- 18-20-24-28
9	24-28-32-40	3/4	9-11-12-14-18-20-24- 26-27-28-32	2	4 1/2-8-10-12- 16-18-20
10	28-30-36-40-48-64	13/16	10-14-18-20-32	2-1/16	12-14
12	20-28-32-36	7/8	10-12-16-18-20-24-27- 28-32	2-1/8	12-16-20
14	20-24-28	15/16	8-9-10-12-14-16-18- 20-24-32	2-3/16	12-16
1/16	60-64	1	10-12-16-18-20-24-27- 32-40	2-1/4	4 1/2-8-12- 14-16-18
5/64	72	1-1/16	12-14-16-18-20-24	2-5/16	12-18
3/32	48	1-1/8	8-10-14-16-18-20-24-32	2-3/8	12-16-18
7/64	48-56	1-3/16	8-10-12-14-16-18-20-24	2-1/2	8-10-12
1/8	32-40	1-1/4	8-10-14-16-18-20-24-32	2-9/16	18
5/32	32-36-40	1-5/16	12-14-16-18-20-24-32	2-5/8	12-16-20
9/64	36-40	1-3/8	8-10-14-16-18-20-24	2-3/4	16
11/64	36	1-7/16	8-10-12-16-18-20-24	2-7/8	8-12-16
3/16	20-24-32	1-11/16	12-14-16-18-20-24	3	8-16
13/64	32	1-1/8	8-10-14-16-18-20-24-32	3-1/4	8-12-16
7/32	24-28-32	1-3/16	8-10-12-14-16-18-20-24	3-1/2	8-12-16
1/4	18-24-26-27-30-32- 36-40	1-5/16	12-14-16-18-20-24-32	3-7/8	6
5/16	16-20-22-27-28-32-40	1-3/8	8-10-14-16-18-20-24	4	8-12
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3	56	9/16	12-18-20-24	1-9/16	8-10-12-16-18-20
4	32-36-40-48	5/8	11-12-18-20-24	1-5/8	8-10-12-14-16-18-20
5	40-44	11/16	11-16-24	1-11/16	8-10-12-14-16-18-20
6	32-36-40	3/4	10-16-18-20	1-3/4	8-10-12-14-16-18-20
8	32-36-40	13/16	16	1-13/16	8-10-12-14-16-18-20
10	24-30-32-40	7/8	9-12-14-18-20	1-7/8	8-10-12-14-16-18-20
12	24-28-32	1	8-12-14-16-18-20	1-15/16	8-10-12-14-16-18-20
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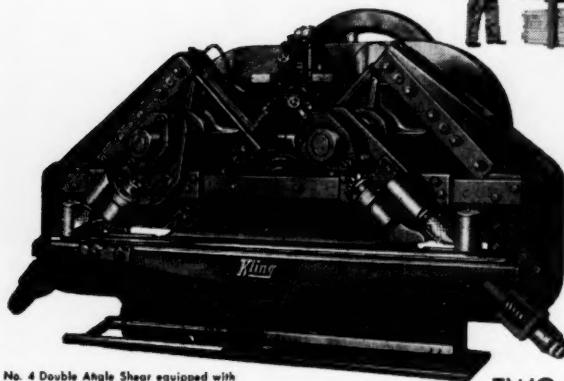
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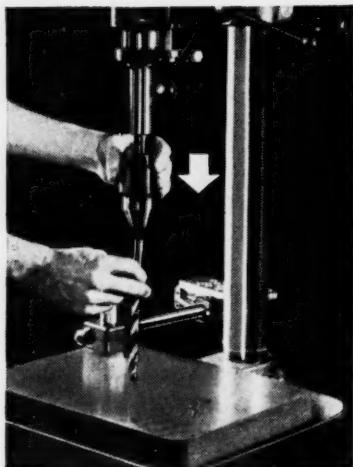


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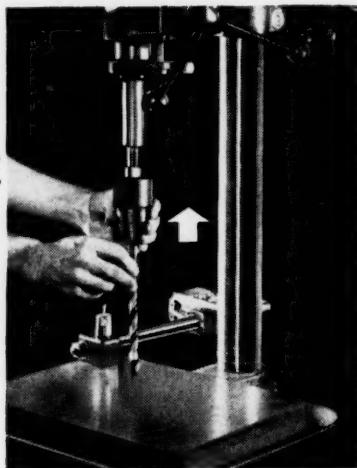


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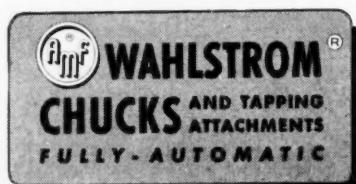
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Modernization Reprints

We had no sooner put the September issue to bed when requests began to pour in for additional copies of the feature articles on the subject of modernization which were especially written by leading authorities in the metalworking field for our 25th Anniversary issue. Some 5,000 reprints of this group of timely and informative articles were made and are now available for distribution. If you would like to have a copy or copies of the reprint, just drop us a line and let us know how many you want. We'll give immediate attention to all requests.

— o —

Terrible Times

We read everywhere dire predictions about what a state this world is in and how it is headed straight for perdition. To maintain a proper outlook it is helpful to know that other men in other times thought similar gloomy thoughts. Here are a few views of our ancestors:

"We live in an unhappy age. The capitalist is insecure in his possessions. The laborer is discontented with his condition. Professional life abounds in disappointments. No century, perhaps is more char-

acterized by unhappiness than this."—*The New Englander* of January 1879.

"It is a gloomy moment in history. Not for years has there been so much apprehension. Never has the future seemed so incalculable. In France the political cauldron seethes . . . Russia hangs like a cloud on the horizon. All the resources of the British Empire are sorely tried. Of our own troubles in the United States no man can see the end."—*Harper's Weekly*, Oct. 10, 1857.

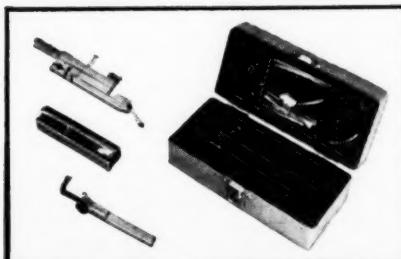
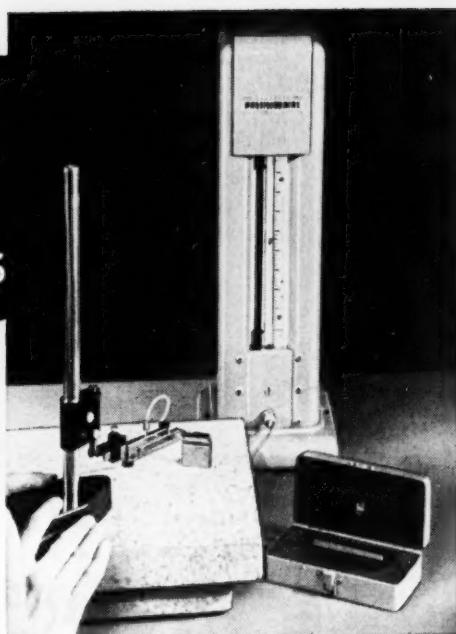
"Our earth is degenerate in these latter days. Bribery and corruption are common. Children no longer obey their parents. Every man wants to write a book. The end of the world is evidently approaching."—Carved on a stone slab in Assyria 2800 B.C.

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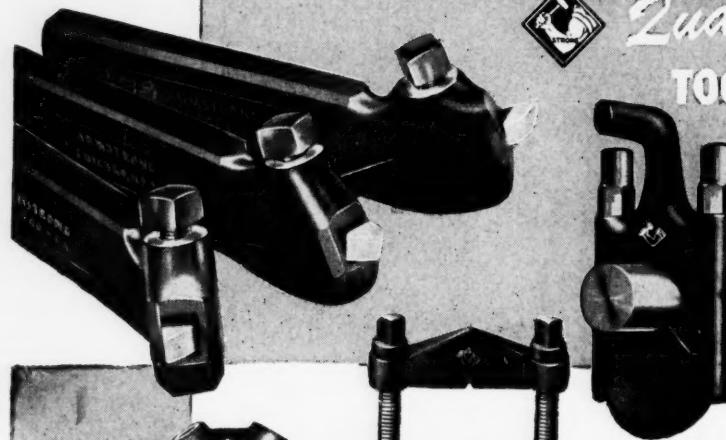
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MODERN Machine Shop

features
in this issue

Vol. 26, No. 5
OCTOBER, 1953

Power House Maintenance Problems

By Lloyd McWilliams

The author describes a number of interesting problems encountered in the maintenance of equipment used in a large hydroelectric station and the methods which were employed to solve these problems. A number of excellent illustrations are included which clearly show the repair jobs performed on various parts of water turbines. Page 150.

Simplified Accounting System Aids Customer Relations

By Horace F. Walsh

The author, who is controller of John Bath & Company, Inc., explains how his company effectively utilizes a Simplified Unit Invoice Accounting Plan in order to assure good relations with purchasers of its cutting tools and gages. Page 164.

Case History No. 8—Machining Stainless Steel

By G. J. Stevens

This case history deals primarily with the solutions to problems encountered when drilling stainless steel. Page 168.

Overhead Conveyor Speeds Shop Production

By Gilbert C. Close

The flexibility of a conveyor system in use at the General Machine Works in Los Angeles assures high production of automotive parts. The author is confident that the system employed in this plant could very aptly be used in many other plants throughout the country. Page 170.

Cooperation Pays Dividends

By Alfred M. Cooper

In this article the author explains how "beyond the line of duty" cooperation between plant supervisory personnel and workers results in maximum production by eliminating friction, fights, and operation delays. Page 182.

35th National Metal Congress and Exposition

The complete programs of the four societies sponsoring this Congress and Exposition are to be found between pages 230 and 266. A list of exhibitors, complete with floor plans of the Exposition, begins on page 268.

Power House Maintenance Problems

BY LLOYD McWILLIAMS

The author describes a number of maintenance and repair jobs performed on various parts of water turbines at Canada's Shawinigan Falls.

MACHINERY, like the human body, becomes fatigued; it ages and eventually fails unless measures are taken to doctor it back into condition. In hydroelectric stations, the conditioning and repair of machinery is generally the responsibility of the maintenance crew. While it is proposed to describe a number of

maintenance and repair jobs, the reconditioning of the badly pitted buckets on a 45,000 horsepower vertical turbine at Shawinigan Falls will take precedence. (Figure 1 shows a new 45,000 h.p. runner before installation.)

Pitting is at times erroneously called cavitation. The word cavitation might well have been applied to the eating away and deterioration of the metal of runner blades. However, the Canadian Electrical Association and other engineering bodies which set up the standard terms used have decided that cavitation



Fig. 1—A new 45,000 h.p. runner before installation.

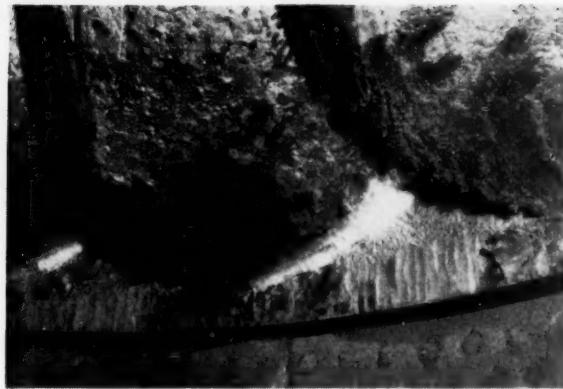


Fig. 2—Badly cavitated trailing edge after several years of operation.

be defined as the action, and pitting the effect of this action.

Cavitation and pitting were explained in this manner by George E. Russell: "Whenever the pressure at a point falls to or below the vapor pressure, masses of the vapor are formed and move along with the stream. If a section be reached where the pressure increases, these masses collapse and by so doing give rise to pressures of great intensity. Experiments indicate that no metal can long withstand this action and, after a period as short as 100 hours, steel plate that was previously smooth was found to be visibly roughened."

The maintenance man, while interested in the theory underlying the phenomenon of cavitation and pit-

ting, is concerned chiefly with making repairs to runners that have developed pitted areas on the blades or buckets. It is with this problem that this section of the article will deal.

Normally, the practice is to make repairs on runners as early as possible; or as soon as there is evidence that cavitation is taking place and attacking certain areas, these areas are filled in by an overlay of stainless steel through arc welding. However, during the last war, due to the increased demands for power, it was necessary to allow some runners on large units to deteriorate beyond the point that good maintenance would permit in normal times. The unit under discussion in this article could



Fig. 3—Not orange peels. This illustration shows sections which were cut away in order to make pattern for inserts.

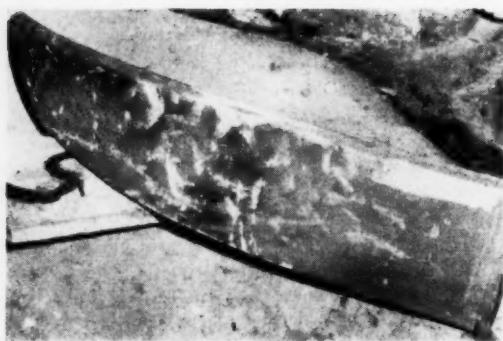


Fig. 4—The stainless steel insert.

be placed in this category.

Several of the accompanying illustrations show the condition of the runner before repairs were commenced, as well as the various steps employed in effecting the repair. It will be noted in the "before" view in Fig. 2 that the trailing edge of the buckets had been completely eaten away; therefore, the "fill-in" method of making repairs was out of the question.

The repair was accomplished in the following manner and without the loss of a kilowatt-hour on the unit: Each week end during the "off-peak" period, the tailrace elevation was lowered to allow entrance into the draft tube directly under the runner of the turbine, where there is a manhole which is normally below water level. A platform was

constructed which could be easily and quickly installed and removed. From this platform all work of cutting, burning, and welding was carried out.

While no undue hazards exist on jobs of this nature, accident prevention must at all times be given consideration. When burning and welding above a wooden structure, fire risk naturally exists. To reduce this hazard, a small fire hose was installed; in addition, a number of CO₂ portable extinguishers were made available. Light, sheet steel pans were placed beneath the work to catch the molten metal which fell during the cutting and burning operation. Actually, two small fires started, but these were quickly controlled with the apparatus at hand. Gases set up by welding were helped



Fig. 5—Stainless steel insert tack welded in place.

Fig. 6 — The welding completed.



to escape by removing the man-hole cover on top of the scroll case, thus increasing ventilation.

The first stage of the actual repair consisted of cutting out two of the pitted sponge-like sections that were the least pitted, as shown in Fig. 3. A pattern was made, using these sections as a guide. Some fitting was necessary to obtain a pattern that conformed to the contour of the blades. This pattern was used to cast stainless steel inserts of the type shown in Fig. 4, with chamfered edges to facilitate welding. The alloy used was Alloy 316-KAMO.

Two pitted sections were cut out each week and two inserts welded

in place, as shown in Figs. 5 and 6. Faulty sections were removed from diametrically opposite sides of the runner to eliminate any possibility of unbalance, since the machine, after clearing out the platform, was put back in operation each Sunday night. The actual welding was completed in twelve week ends. The final stage of the work consisted of grinding down the welds to obtain a smooth surface, as shown in Fig. 7, following which a number of small cavities that

had developed near the "crown" of the runner were also filled in.

It is rather interesting to note that from an economical point of



Fig. 7 — The finished job. Note how smoothly the inserts conform to the original contour of runner blades.

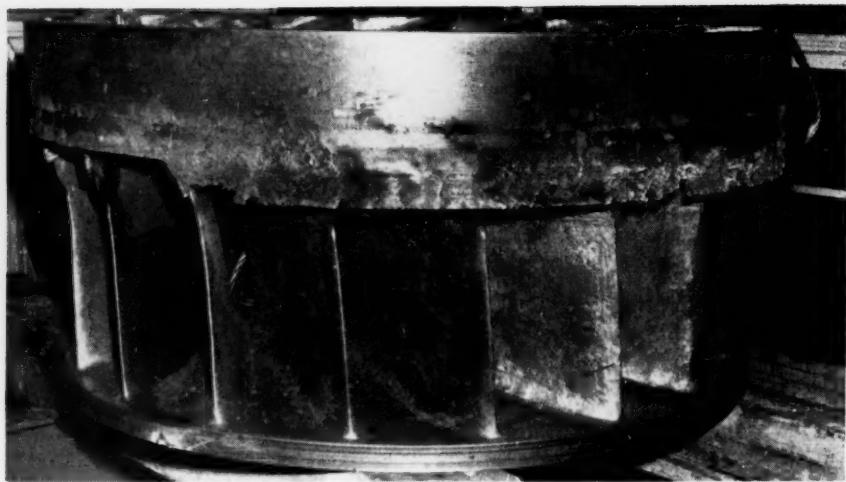


Fig. 8—One of the pitted runners from a 20,000 h.p. horizontal machine. This runner had 40 years of service.

view this job proved less costly than some of the "fill-in" jobs on other similar runners.

Small Runners

Experience over the years indicates that, by far, the majority of Francis runners develop pitting at or near the "trailing" or discharge

edge of the buckets. An exception was experienced with the runners on several 20,000 h.p. double-runner horizontal machines of 1911-14 vintage. The pitting on the buckets of these old runners was remarkably slight after 40 years of operation; however, severe pitting had developed on the bands where the buckets adjoin at the seal ring position, as indicated in Fig. 8.

Little description is necessary

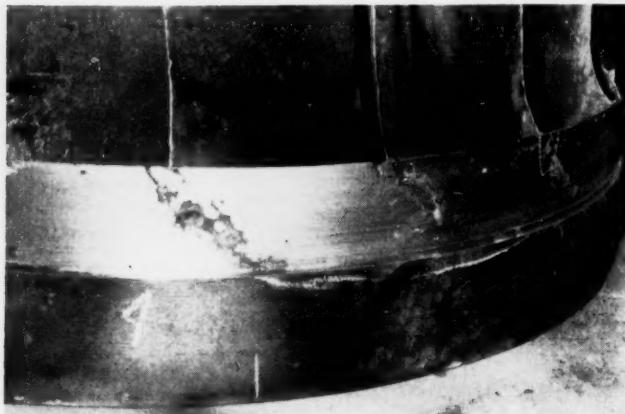


Fig. 9—Close-up view of runner after machining off the pitted areas. Note "piping" holes.



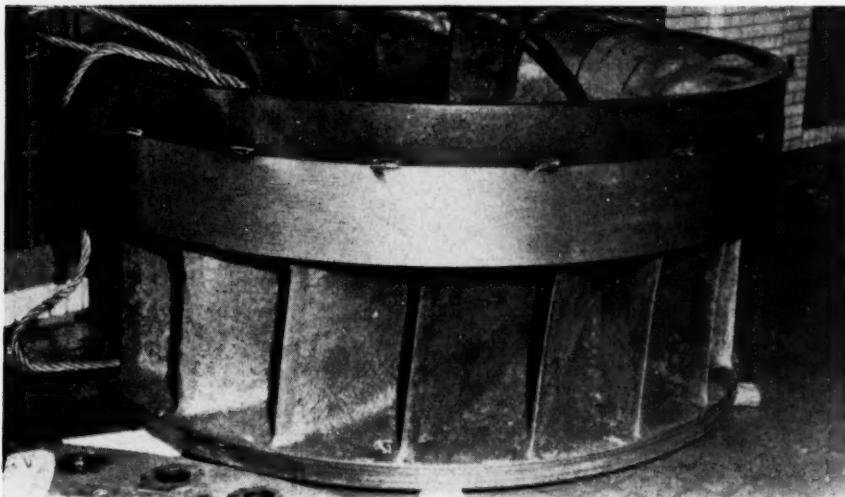
Fig. 10—The ring before being shrunk on runner.

as to the manner in which repairs were effected, since the illustrations tell the story. Attention is directed to Fig. 9 showing the runner after machining the pitted area. In evidence are the "piping" holes in the casting which are characteristic in castings of some 40 years ago. This condition and the discovery of severe cracks

where the buckets adjoin the runner band naturally gave concern since this loss of material would have materially weakened the runner. What might happen should a runner disintegrate inside a scroll case is a matter of conjecture.

At first, thought was given to the installation of runners of modern

Fig. 11—The completed repair.



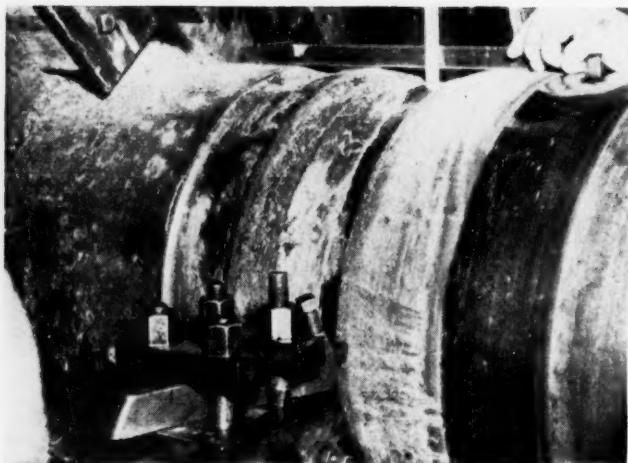


Fig. 12—A 20-inch grooved shaft at gland location on a 20,000 h.p. turbine.

design which would give slightly more output at better efficiency, but, as deliveries were in the order of a year or more, it was decided to repair two units on which the pitting and cracks were most pronounced. It will be seen from Fig. 9 that the first stage of the job was to machine off the sponge-like material. A pre-formed steel ring, as shown in Fig. 10, was then shrunk into place over the machined runner band. This was followed by spot welding and the runner was again placed on a bor-

ing mill and turned down to the correct dimensions, as shown in Fig. 11. Welding on this class of work is always kept to a minimum because of the danger of warpage and the possibility of cracks due to shrinkage.

Naturally, while a job of this size is in hand, advantage is taken to

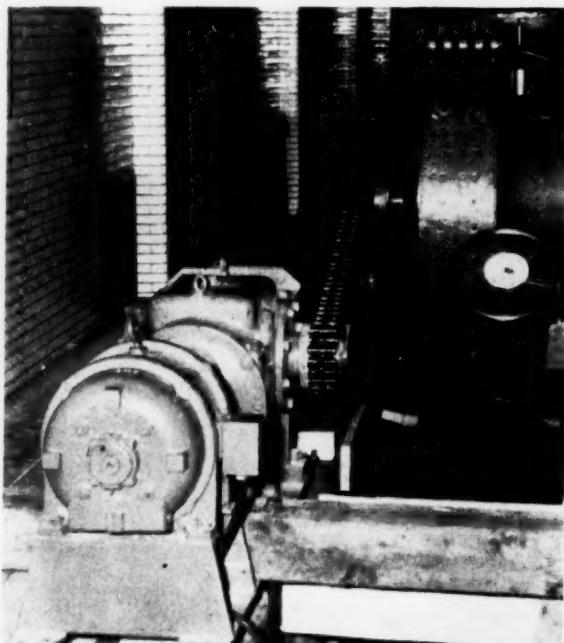


Fig. 13—This illustration shows the manner in which the shaft was turned.

Fig. 14—Water turbine shaft in process of being metallized.



make other repairs on the component parts of a turbine. The linkage system which operates the vanes, the vane stems, and bushings are repaired or replaced. The servomotor and governor can be completely overhauled. In this connection, a description of the rebuilding of a badly grooved shaft while in place in its bearings should be of interest.

Grooved Turbine Shafts

After an operating period of 40 years, considerable wear takes place on the shafts of water turbines at the gland locations, as indicated in Fig.

12. They become scored and grooved; difficulty will be experienced maintaining the packings and annoying leakage often results.

Grooves which were $\frac{3}{4}$ -inch deep on the 20-inch shafts of five horizontal machines were successfully corrected by filling in the worn sections by metallizing with stainless steel. For those familiar with the metallizing process, such a repair poses no difficulties; however, a brief description of the job setup may prove helpful to those who might be faced with a similar problem.

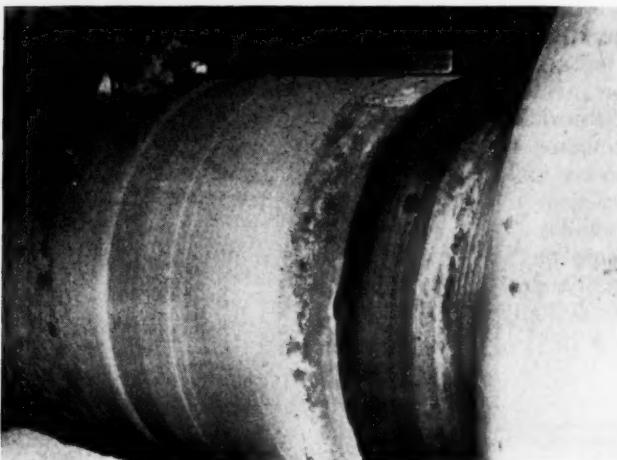


Fig. 15—The metallizing finished, the job is now ready for machining.

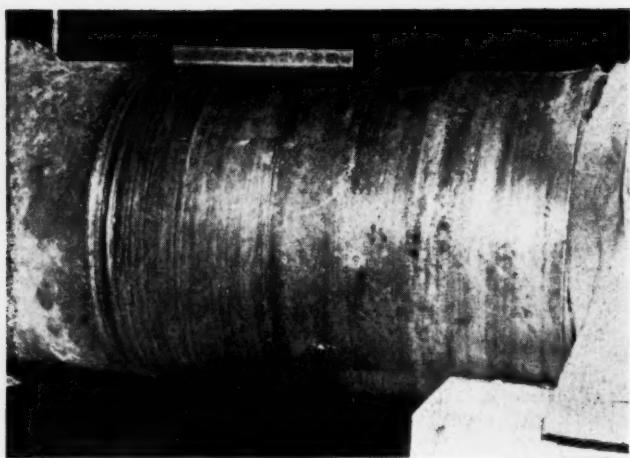


Fig. 16—The shaft after machining and grinding.

To machine and prepare for metallizing a shaft of this size, it is necessary to rotate the shaft at low r.p.m. A speed reducer of high ratio was removed from another piece of apparatus and installed, as shown in Fig. 13. This arrangement provided a speed of 5 r.p.m. which proved ideal for all preparation machining, metallizing, finishing, and grinding. On work of this size, the preparation consists of first cutting vee grooves, eight to the inch, after which a special knurling tool is used to roughen up the vees. Cleanliness is essential, both during preparation and while metallizing since dirt or grease on a surface to be metallized

will result in failure. After filling in the grooves in the shaft by metallizing, as shown in Figs. 14 and 15, the shaft was turned down and then ground to a smooth finish, as shown in Fig. 16.

It is now five years since the first shaft was built up in this manner and no "bugs" have developed. Incidentally, a 7½ h.p. motor proved ample to turn the shaft and the run-



Fig. 17—A scored and out-of-round "guide sleeve" for a 30-inch shaft on a 45,000 h.p. turbine.

Fig. 18—Guide sleeve in process of being metallized.



ners, a weight of approximately 36 tons.

Guide Bearings and Shaft Sleeves

On large vertical turbines, there are one or more guide bearings, their function being to maintain the shaft in a plumb position. "Guide sleeves" for the bearings are fastened to the shaft at the bearing points to take the wear which otherwise would occur on the shaft. Many types of guide bearings are water lubricated, the bearing liners consisting of lig-

num vitae and rubber; and, of late, Ryertex, one of the synthetic, fibrous materials, has been successfully employed.

Due to abrasive particles in water, bearings and sleeves become worn. This is immediately evident by shaft "swing." Bearings are usually replaced by a spare and, should one be "caught" without a spare, the liners of the bearing can be shimmed and the bearing bored to suit the guide sleeve. When the sleeves become eroded and scored, as shown in Fig. 17, the situation is more serious. The installation of new sleeves is a costly time-consuming proposition.

Some years ago it was realized that there would be a considerable saving effected if these "guide sleeves" could be successfully rebuilt. The sleeves which came to the shop were of bronze and we decided to attempt spraying stainless over

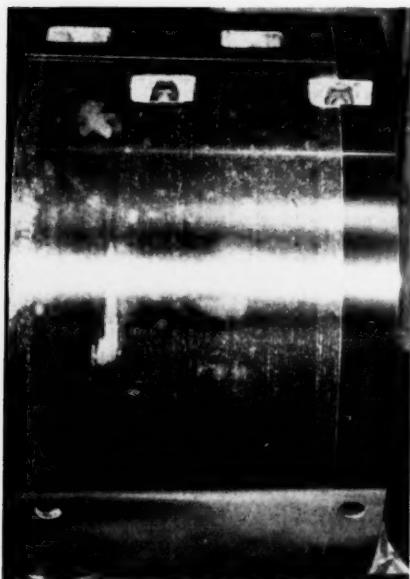


Fig. 19—The sleeve after machining and grinding.

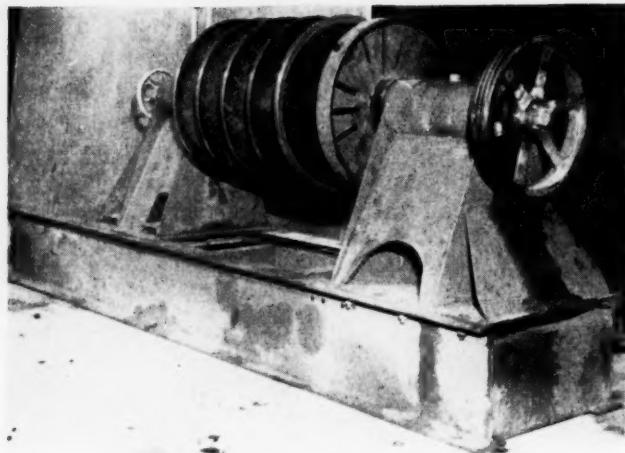


Fig. 20—A shop-made lathe which was specially devised for "guide-sleeve" work.

the bronze. The same procedure was followed as when repairing shafts; namely, cutting vees, knurling, metallizing (Fig. 18), machining and grinding (Fig. 19). The job was successful. The experience here is that guide sleeves show appreciable wear after 15 years of operation and, to date, a considerable number have been revamped without failure; in fact, it is now believed that sprayed metal offers a superior bearing surface due to its porosity. Figure 20 shows a shop-made lathe specially devised for "guide-sleeve" work.

Cutting A Keyway

While dismantling a 35,000 h.p. unit, the generator of which had to be rewound, it was noticed that the thrust block located above the "Kingsbury" bearing was loose. Further investigation revealed that the key was loose and had started to roll in the keyway. The rotor and shaft on this machine weigh in the vicinity of 200 tons and naturally it gave the maintenance men some consterna-

tion when tentative plans were first made to remove the rotor and ship the shaft to a large engineering works where a new keyway could be cut. Costs and outage

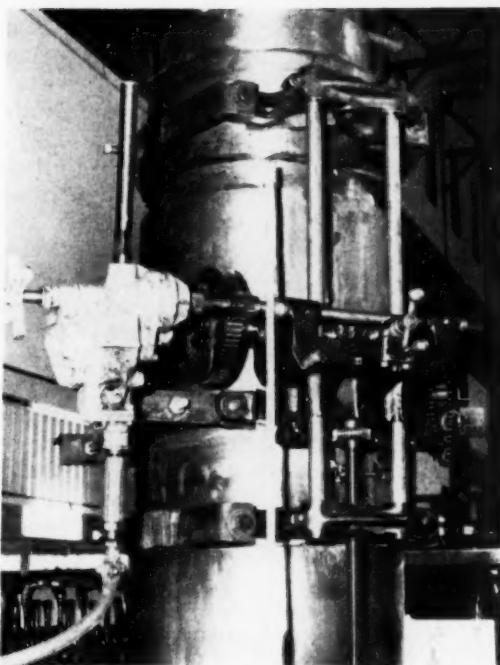
time would have been considerable.

Fortunately for most concerns throughout the country, we still have a few "Old Joe's, Tom's, Dick's, and Harry's" who received their early training in mechanics by repairing a broken-down mowing machine with a minimum of spare parts and tools. Figure 21 shows the result of one old-timer's ingenuity. An old keyway cutting machine that had laid idle and been forgotten for twenty years was resurrected and, although originally designed to cut keyways on a 10-inch shaft, it was, after a few refinements, made into a clamp-on type milling machine. Powered by an air-driven drill, little difficulty was experienced in cutting the new keyway. The money saved by such a performance is incalculable.

Sluice Gate Protection

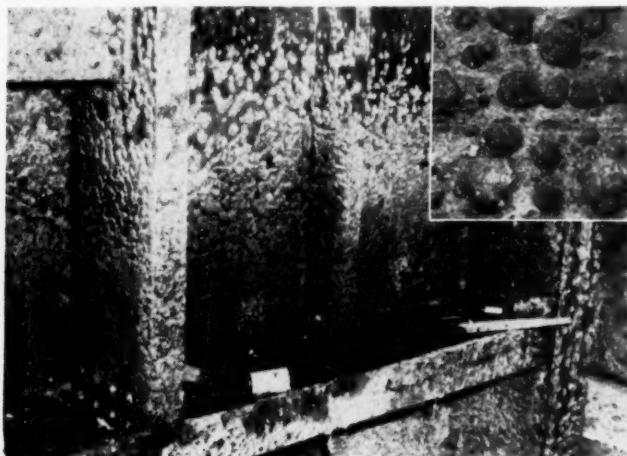
The protection of underwater steel surfaces (sluice and dam gates) has long been a troublesome and costly maintenance problem, as indicated

Fig. 21—This view shows the apparatus used to cut a keyway on a 30-inch shaft of a 35,000 h.p. unit.



by Fig. 22. Every hydrostation has it. In the Shawinigan system, there are 78 sluice gates and 105 dam gates. In the past, red lead and numberless types of paints have been tried out, with results far from satisfactory, the best life in most cases being four years; however, red lead, when applied under ideal conditions to a sandblasted surface, has stood up for seven years or more.

With the advent of metalizing, it was thought that here was the solution to the protective problem. Gates were sandblasted and sprayed with zinc, approximately 5 mils in thickness, in the manner shown in Fig. 23.



The results were most disappointing. In two years, the zinc lifted and rust was in evidence in numerous places on the surface of the gates. Experiments showed sprayed zinc to be quite porous and that water under pressure could be forced through a sheet of zinc several

Fig. 22 — Illustration showing rust and barnacles on a headgate. (Inset) Closeup view of barnacles.

mils in thickness. But, since the somewhat rough surface offered an ideal surface to which paint would adhere, as shown in Fig. 24, a gate was experimentally painted with one of the vinyl base plastic paints. While not paints in the strict sense of the word, they are applied like paints, with spray gun or brush. There are a number of these plastics on the market and unlike paint they dry by solvent evaporation rather than by oxidation. As the solvents evaporate, an extremely tough tightly-adhering plastic film is formed. Eleven years ago, a gate which had been sprayed with zinc was given a coat of Tygon, one of these vinyl plastics, and the 1952 inspection reports it to be in excellent condition.

Fig. 23—A large headgate being metallized with zinc.



Some maintenance men will raise a questioning eyebrow regarding the costs involved by metallizing and painting. True, costs are greater; however, if a 15-year life could be anticipated, the economical considerations are in favor of this method. Why not apply the vinyl base paint over a sandblasted surface? This has also been done, but there has not been a sufficient lapse of time since application to determine the result comparatively.

The foregoing is not intended to intimate that vinyl base paints are the solution for underwater protective coatings. There are other products which show promise. Coal-tar enamel, a relatively new product (insofar as paints are concerned), was

Fig. 24—Close-up view of finished surface of headgate. Note the pock-like pockets where barnacles have been removed.



used by the Pacific Gas and Electric Company on penstocks, and a test patch is reported to be looking like new after 26 years. The Los Angeles Department of Water and Power reports no deterioration of a coating on submerged steel pipe after 12 years. At the Panama Canal, success has been reported with chlorinated rubber and other rubber-base paints over a metallized surface.

But back to vinyl with its ease of application. A new technique of applying vinyl paints has been devised by the U. S. Navy. A new vinyl copolymer resin has been developed which is extremely hard in comparison to alkyd type paints. This new vinyl paint requires a special primer

containing phosphoric acid (applied after sandblasting) which etches the metal and contains some of the vinyl resins and a lead chromatic base which gives it excellent bonding properties.

The old maintenance man, no doubt, is still looking forward to the day when some alloy which is non-rusting, non-corrosive, inexpensive, and strong can be used in place of steel. He can then put his feet up on his desk and forget this painting business.

Stainless Steel Film

A 16-mm. sound and color film entitled "Resistance Welding of Stainless Steel" has been released by Allegheny Ludlum Steel Corp., Henry W. Oliver Bldg., Pittsburgh 22, Pa. The film discusses spot welding, seam welding, projection welding, and butt welding. Generous use of animation and drawings clarify the regular picture material. The running time of the film is 22 minutes.

For further information on any product mentioned in this issue—use the READER SERVICE CARD between the covers.



Simplified Accounting System Aids Customer Relations

BY HORACE F. WALSH*

In which the author explains how his company effectively utilizes a Simplified Unit Invoice Accounting Plan to assure good relations with purchasers of its cutting tools and gages.

AS a manufacturer of taps, gages, and other cutting and threading tools, John Bath & Company, Inc., Worcester, Mass., is well integrated

into the continuing defense program. The production and sales of our tools provides a sensitive barometer as to the status of the defense requirements. And we feel a serious responsibility to those industries which need our products. During emergency periods the demand for precision tools increased to a marked degree. This sets up conditions which frequently deteriorate customer relations. We have taken steps to be sure that our customer relations remain at a normal, high pitch. We meet deliveries, specifications, and price levels whenever and wherever necessary.

It is the feeling of our management that accurate, up-to-date, and regularly executed accounting is one of the basic services that can



Records are housed in Remington Rand Safe-Files.

Orders are typed on invoices on Remington Electric Typewriter. Ten to fourteen copies are produced in one typing.

be furnished to customers. Errorless accounting precludes irritation and friction. This insures friendly relations, and at the same time falls within the scope of sound accounting practice.

With this thinking in mind we installed the Remington Rand Simplified Unit Invoice Accounting Plan, or SUIAP. Our procedure was published in a recent book by Prentice-Hall which referred to our system as follows: "The accounting plan used by John Bath and Company, Worcester, Mass., provides an accurate control of unpaid invoices without using an accounts receivable ledger.

"Copies of invoices are filed in visibly indexed V-shaped pockets in Kollect-A-Matic files. These invoices replaced ledger entries. Visible signals are set up when the invoices are filed and show at a glance the age of the oldest unpaid balances. Delinquency analysis is quickly accomplished since page-by-page ledger scrutiny is unnecessary. Accounts needing attention by the credit manager are spotlighted, and aging of accounts is done without matching payments and merchandise against invoices.

"Unlike accounts receivable ledgers, the plan involves working only with unpaid charges, paid items being removed from the files."



No customer of ours can receive irritating invoices carrying previously paid items. At the same time we are well able to keep on top of those items and accounts which tend to delinquency.

The entire routine is quite simple. From an accounting point of view, the controls are rigid and the tests of accuracy complete. Skilled and hard-to-find machine operators are not needed. Clerks of average intelligence and conscientiousness are able to perform the work satisfactorily.

We are convinced that SUIAP has proved a real benefit to us in getting our accounts receivable work done with less cost, and with greater satisfaction to our own and our customers' organizations. When we started the system we ended a situation in delinquency which generally ran to



The Simplified Unit
Invoice Accounting
plan is housed in a
fire protected drawer.

three typewritten pages of accounts and amounts. Many thousands of dollars of overdue sums were in such a bad state that the accounts were impossible to reconcile.

At present, although we process over two thousand invoices per month running into tens of thousands of dollars, we have relatively few accounts falling into the delinquent classification. There are three distinct types of invoice in use. One form relates to tools ordered from our standard stock inventory, which require no special handling. Another invoice deals with orders from individual customers who order taps or gages which do require special design or handling. The third form concerns orders from our dealers, which may also require special engineering, machining, and so on. These orders are usually for our ground thread taps, which we originated, and which did away with irregularities prevalent in *uneven*

hardening methods. The automotive, aircraft, farm machinery and equipment, and similar industries where *ever* machine tools are used represent *our* customers. Our annual sales in precision ground tools *run* into

millions, and therefore absolute care is taken in the processing of all invoices and the flow of information stemming from orders.

The orders are typed on the invoices. We do this work on Remington Rand Electri-economy typewriters, which have increased production while providing clear carbons of the ten-to-fourteen-copy invoice forms used. Since the copies are routed throughout the various production and accounting departments, the information on them must be easily read. Electric typing assures clarity in every carbon copy.

Four of the copies—three customer's invoice and one agent's acknowledgment—are mailed out immediately. The others flow to particular departments for added information. The first typing operation takes in the customer's name and address, date wanted, customer order number, and shipping destination. Also entered are the quantity ordered and

style and list number. This applies to stock items only.

When producing non-stock items, we use the following procedure: The editing and pricing are done on the customer's purchase order, which is then sent to the order department for typing. These orders are made in fourteen copies. The three copies of the customer's invoice, the book-keeping copy, and the commission copy are filed numerically. Agent's shipper's copy, shipping memo, and packing slip are sent to the Shipping Room. Agent's and customer's acknowledgment are sent to the Production Department where the shipping date is inserted in these copies mailed to the respective parties.

The reference copy is sent to the Engineering Department. The office copy is filed in the office alphabetically. The scheduling card is also sent to the Production Department and an expediting copy to the expeditor. When the parts are shipped, the agent's shipper's copy is sent to the office with information to them to mail the customer's invoices, release the Bookkeeping Department's copy to that department and the commission copy to the Sales Department.

We also have a special Production Control Card attached to the set of invoices, so that when the preliminary typing of the invoices is done the name and address of the customer and the requisition number go on this card simultaneously. It is then sent to the Production Control Department for follow-up on the flow of the order through the various machining operations to the shipping of the finished tap, micrometer, or gage. When the order is shipped, whether

in part or complete, the proper invoice goes to our Accounts Receivable Department, where it is filed in the Kollect-A-Matic desks for processing under the SUIAP system.

Our system is complete and thorough. We can devote ourselves to the big job of producing the precision tools that the invoices represent. With the protection of a precision accounting system such as SUIAP, we know that so far as accounting touches on customer relations we will not suffer.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.



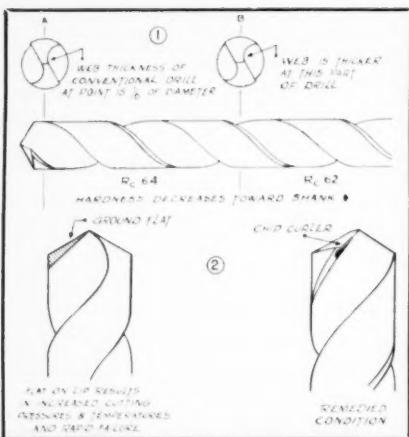
"Well, what is it this time, Swenson
... another raise?"

Case History No. 8

Machining Stainless Steel

By G. J. STEVENS*

1. A screw machine shop was having trouble with poor work on thin-walled stainless steel parts. Shop men were using shortened drills



made from long ones. Since the web of the drill became thicker toward the shank, they had to thin the web to lower cutting temperatures. The thin wall of the part prevented heat from being conducted away from the drill.

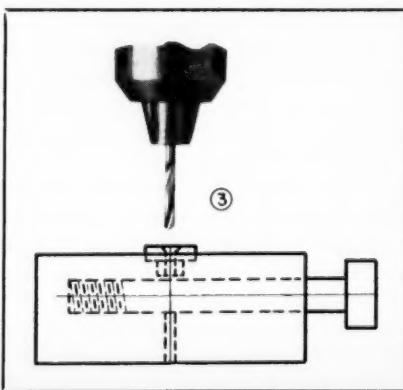
2. When the web was thinned out, the helix angle of the drill was lost. There was no chip curler at the lip. Flattened drills then cut with a zero degree top rake angle instead of the approximate 10-degree angle recommended for stainless steel. The

grinding in of a chip curler rectified this condition.

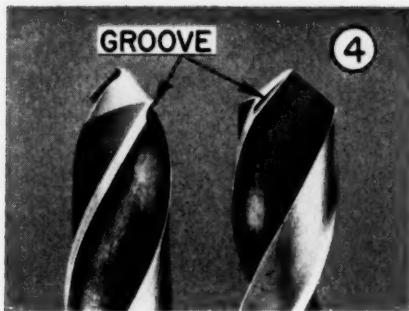
The simplest way to avoid these troubles is to use only short drills made especially for screw machine work.

3. Bushings should always be short when you are using a drill jig. Then you can use a short drill and do good work. Use removable bushings if chip congestion in the bushing is causing you trouble.

4. For the average machining job, drills should be backed out at intervals to relieve chip congestion. The general rule for automatic screw machine work is, on the first insertion, the drill should be fed in a distance three to four times its diameter and then backed out; on the second insertion, one to two times its diameter.



* Machining Engineer, Armco Steel Corp.



eter and then backed out; and on the third and fourth insertions, three-fourths times its diameter before backing out. Illustration shows groove that aids chip elimination on automatics.

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Overhead Conveyor Speeds Shop Production

BY GILBERT C. CLOSE

In which the author explains how a West Coast manufacturer utilizes a flexible conveyor system to assure high production of automotive parts.

WHILE parts in progress lie idle in a box on the machine shop floor, awaiting the next production operation, you are losing money." This is the well-founded philosophy of Elmer L. Lipp, president and general manager of the General Machine Works, Los Angeles, California. Mr. Lipp has demonstrated that he knows what he is talking about. He founded General Machine Works some 35 years ago, and his

jobbing business has been on the upgrade ever since. He was one of the first west coast operators to breach the formidable "Detroit production line" for auto parts and accessories. Today, more than fifty per cent of his production is routed to the huge west coast auto assembly plants. When, in the not too distant future, cars are priced F.O.B. California, Elmer Lipp and his 100 employees can be excused for exchanging knowing smiles of accomplishment.

"The average job shop operator places too much emphasis on individual machine production rec-

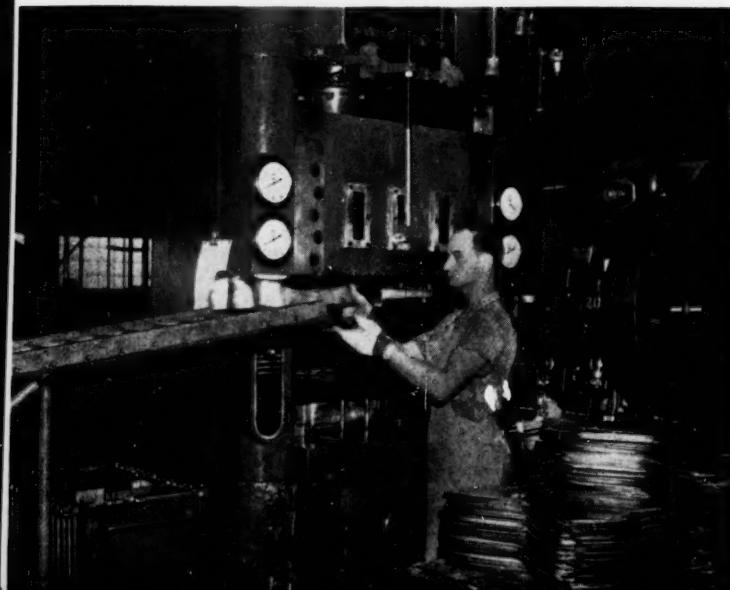


Fig. 1—The conveyor system starts with the first draw press operation. Here the press operator is placing a rough formed part on a gravity conveyor which feeds it to the next press operation.

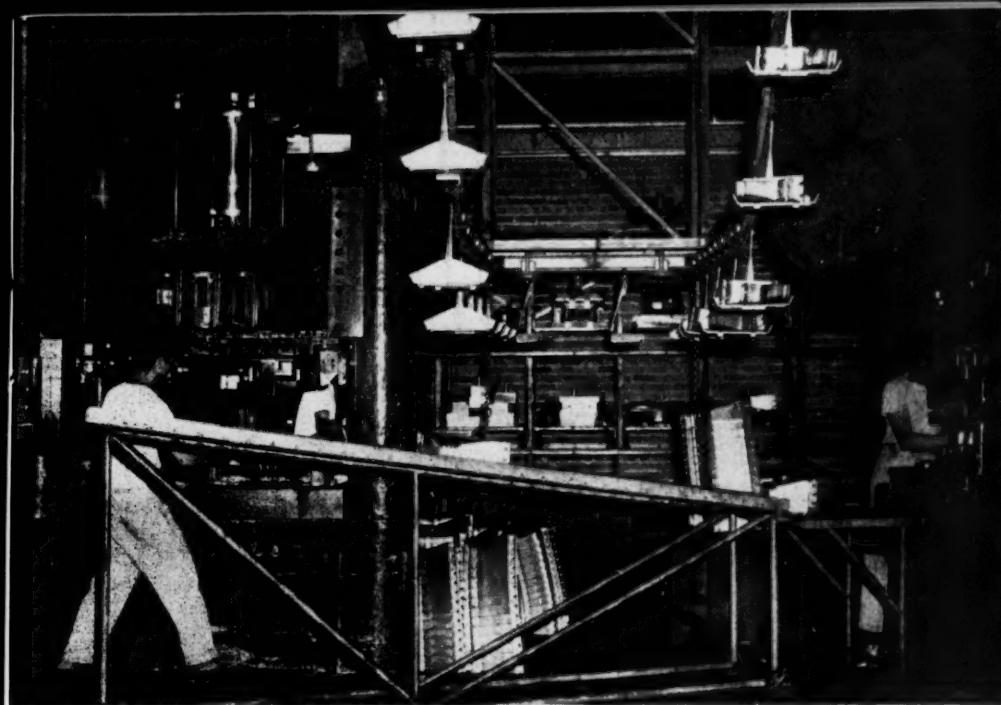


Fig. 2—Parts from the second forming press (left) are moved by gravity conveyor to the parting and trim press (right) without a pause in the production cycle.

ords," Mr. Lipp says. "He will go to extremes to increase this production and then immediately lose sight of the half-finished parts after they are boxed and awaiting the next production operation. We have solved this problem by the installation and use of a flexible conveyor system that may be quickly adapted to any production order of sufficient size to warrant its use. With such a conveyor system, parts are kept in constant motion from the raw stock stage until they emerge as finished components."

Mr. Lipp pointed out other advantages of conveyorized production. Physical handling of parts is reduced to a minimum. Floor space is conserved because temporary storage of parts in process is not necessary.

Shop aisles and space are not cluttered by lift trucks moving boxed parts from one operation to the next.

While portable and fixed gravity conveyors have been used for many years in the General Machine Works shop, the first powered, overhead chain-link installation was made by the Jervis B. Webb Company in 1950. Webb company engineers, long experienced in overhead conveyor installations, worked closely in hand with General Machine Works engineers to make the new system fit both the flexibility and efficiency requirements of smaller shop operation.

Flexibility was accomplished by suspending the conveyor system on welded angle brackets which could be easily moved from place to place

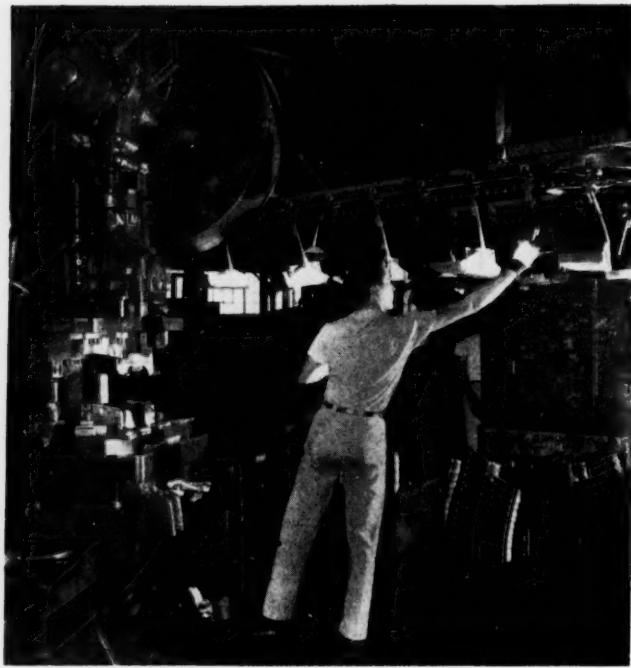


Fig. 3—After parting and trimming, the two components are placed in the color-coded conveyor buckets for delivery to the fabrication department.

halves in a rough finished condition. After the part is drawn, it is removed from the dies and placed on a small gravity conveyor which carries it to the next operation, as shown in Fig. 1.

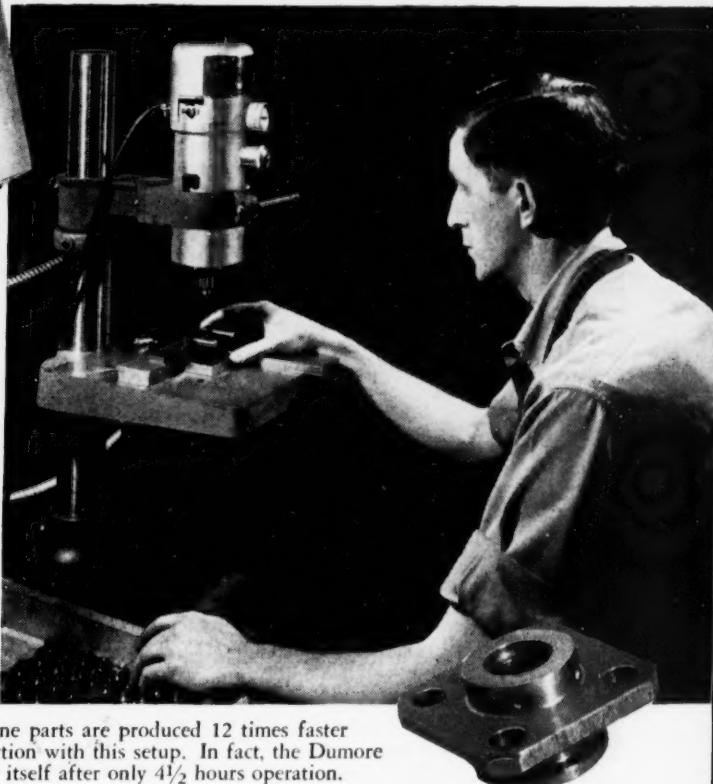
When the part emerges from this second forming operation, it is placed on an

when rearrangement of the conveyor layout became necessary. Efficiency was introduced by incorporating short gravity conveyors to transport parts from one operation to the next until they were ready for overhead transportation to another fabrication department.

How this system operates is well illustrated in the current production line used to turn out formed sheet metal components for an automobile engine hood hinge. The parts are blanked from solid rolled steel prior to the first forming operation. Each blank contains material for both a left and right-hand component. The first forming operation, accomplished on a company-tooled HPM draw press, leaves the two joined part

other small gravity conveyor which transports it to the final trimming and parting operation, as illustrated in Fig. 2. A single operator mans the Niagara press used for trimming and parting the formed section into left and right-hand part components. These sections are then placed in the overhead conveyor buckets for transportation to the spot-welding department, as shown in Fig. 3. The conveyor bucket side panels facing the Niagara press operator are alternately painted red and left unpainted to designate proper placement of the right and left-hand components. This segregation is necessary, as the right and left-hand components are delivered to different spot-welding machines lo-

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cated in the fabrication department.

To facilitate this preselected delivery, properly spaced lips protrude downward from the forward edge of each conveyor bucket. Half of the buckets are equipped with a centrally located lip, while the other half (alternates) are equipped with two lips spaced far enough apart to span the gravity conveyor stop used to trip the one-lip buckets when they arrive. This arrangement is illustrated in Fig. 4. Here the two stops on a short gravity conveyor have just contacted the two lips on an overhead conveyor bucket and are dumping the part onto the gravity feed. The single stop on the rear (right-hand in the illustration) gravity

conveyor for tripping the buckets with a single centrally located lip can be seen.

With this arrangement, right and left-hand components are automatically delivered to two Acme spot welders, each tooled for the next operation on the right and left-hand components respectively.

The overall simplicity of this conveyor arrangement speaks loudly of its efficiency. From the moment a blanked part is placed in the first draw press until it emerges as a completely formed, trimmed, and parted pair of components, there is no pause in the production cycle. The imagination and inventiveness used in conveyor system layout, in color-

Fig. 4—Here the right and left-hand components are dumped onto two different gravity conveyors which carry them to two Acme spot-welding machines. How this preselected delivery is accomplished is explained in text.



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Fig. 5—Elmer L. Lipp, founder of General Machine Works and now president and general manager, examines a finished component selected from the huge pile of similar components behind him.

"It stands to reason, with a little thought, larger production orders can be conveyorized," Elmer Lipp (see Fig. 5) points out. "And when conveyors are used, we have discovered that they invariably cut production costs. These lower costs result

from less material handling, less capital tied up in partially finished parts, conservation of shop space, and, perhaps most important, the relative ease of gaging production line output to delivery requirements.

coding the conveyor buckets for right and left-hand components, and in delivering the proper components to the proper spot-welding machine for the first phase of the fabrication process all add up to this efficiency.

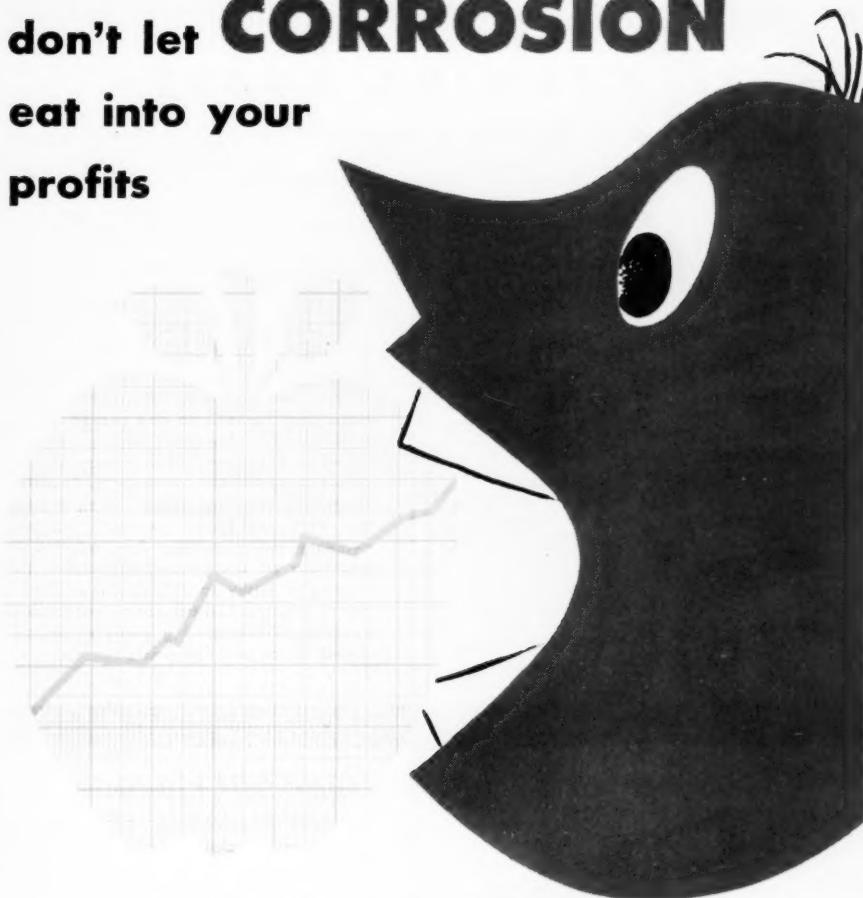
Engineering Drawing. By Frank Zozzora. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. 369 pages. Illustrated. Cloth binding, board covers. Price, \$5.00.

This book is a text on engineering drawing to meet the needs of three groups (student, teacher, and practicing engineer) and specifically designed to present the essentials of the course in a short concise manner. It provides the student with the fundamentals of engineering drawing without requiring him to learn specialized details and techniques that will prove of little value in his professional career. For the teacher, the volume offers the op-

portunity to cover comprehensively the essentials of the subject in the limited time allotted in the present-day curtailed curriculum. For the practicing engineer, it affords an invaluable reference for review of basic procedures. Over 700 carefully annotated illustrations make the book an extremely teachable text.

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For small diameter holes, Barber-Colman Solid-Fluted Reamers provide maximum flute strength, quick chip disposal, precision control of roundness and size — and finish that in many cases eliminates lapping. Maximum chip clearance with strongly supported cutting edges provides rigidity and free cutting action for reaming holes to extremely close tolerances. All basic styles and types are included — Precision Jig Boring, Expansion, Taper Reamers, Oil Feed Reamers, Chucking Reamers and Solid Line Reamers.

These features mean better, faster results, with less cost per hole machined. Ask Barber-Colman reamer engineers to assist on your reaming jobs, or send tool and part prints for recommendations.

Custom Built to Fit Special Reaming Problems



Years of experience in testing and designing reamers for maximum performance under a variety of conditions have permitted Barber-Colman engineers to specialize in the manufacture of custom tools to fit special reaming problems. Tools are designed for special conditions of size, finish, tool life, production, or to adapt a reamer to a particular part or machine. Cutting flute profiles, clearance angles or flute design are applied to meet the specific condition.

Reamer Sharpening

Barber-Colman reamers are sharpened by conventional methods on any standard cutter sharpener. For easier sharpening, with positive mechanical duplication of cutting form and clearances, Barber-Colman also offers the Automatic Reamer Sharpener. This semi-automatic method of precision sharpening is particularly desirable for high production reaming applications to assure hole-to-hole consistency.

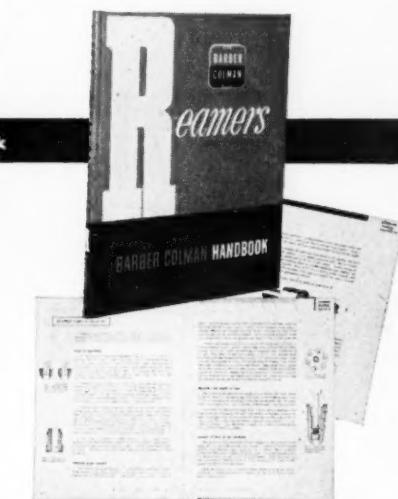
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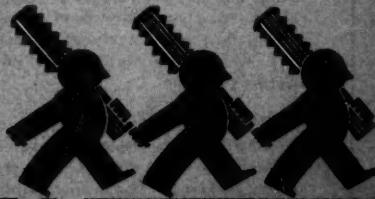
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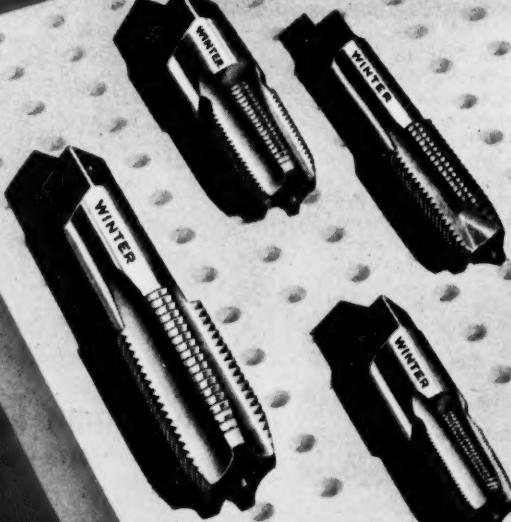
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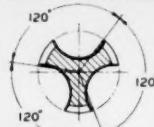


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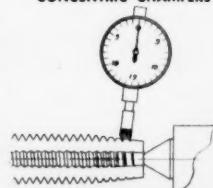
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Cooperation Pays Dividends

By ALFRED M. COOPER

In which the author explains how "beyond the line of duty" cooperation between plant supervisory personnel and workers results in maximum production by eliminating friction, fights, and operation delays.

RIGHT after the big crash of '29, I happened to be in the office of a superintendent of a meat packing company in a midwestern city. Times were really hard and this man's subordinate supervisors were most anxious to hold onto their jobs.

There was a Community Chest drive on, and the superintendent asked me to stay while he called in his foremen. He explained to them in a few words how he expected each to go about getting contributions from workers. Then he wound up as follows: "And if any of you guys don't get your department over the top by next week, there's a lot of fellows out there at the gate looking for your job."

This superintendent wasn't kidding, either. *He was of the old-fashioned hard-boiled slave-driving type.* A week or so later, while I was doing some consulting work in his plant, I told him that the principal difficulty among his supervisory force was a lack of cooperation. He stuck out his jaw, glared at me, and then yelled for a stenographer. At once he dictated an order to her, a copy of which was to be sent to his foremen.

"Effective this date," the order read, "any foreman who does not cooperate fully with any other supervisor will be fired." Then he sat back. "I guess that takes care of that," he snapped. "We'll have cooperation around here from now on or there'll be some heads lopped off."

I mention these two incidents to show the sweet way in which the old-time superintendent often went about the job of securing the cooperation of his subordinates. When you studied the workings of such an organization you were not surprised to find that cooperation was almost non-existent throughout the company. The supervisors carried out



"He was of the old-fashioned hard-boiled slave-driving type."

Illustrations by Don Ritchie.

their orders to the letter and thereby kept out of trouble. But there is a world of difference between meticulously following all orders and truly cooperating.

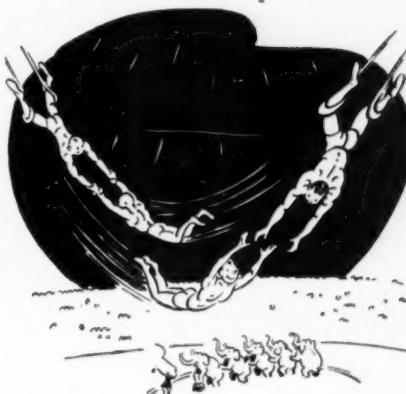
This superintendent would not have gone out of his way to cooperate with anybody. Neither did his foremen actually cooperate with him, with each other, or with their own workmen. As a result of this one man's attitude, the entire plant was pretty much of a madhouse.

Of course you simply cannot secure cooperation from anyone by issuing an executive order. Nowadays, foremen and superintendents are aware of this fact, and as a rule approach this vital problem much more intelligently. Yet, even today, you occasionally run across an executive who says "I'm going to have cooperation in this organization or know the reason why!"

Of course he never wins cooperation in that fashion, since this teamwork is something that must develop outside the line of duty and cannot be secured by a score of executive orders. *You cooperate with your brother supervisors out of a sincere spirit of good will and because you know you may need their complete cooperation at any moment.* Then, you cooperate with those reporting to you because you know you can do more for these people than anyone else, and again you expect them to cooperate with you when production schedules get tough.

Cooperation is a two-way street. Nowadays the supervisor who goes it alone and neither gives nor accepts help from anyone does not stay around very long.

Having conducted discussions on this subject with more than 10,000 industrial supervisors, I am often surprised to find that many of these men are hazy as to exactly what the word "cooperation" really means. Thus, I have asked groups to define



"You cooperate with your brother supervisors out of a sincere spirit of good will and because you know you may need their complete cooperation at any moment."

cooperation and got such answers as "Well, I get the finished product of my department over to Jones' department right on time. So I'm cooperating with him."

Actually, this supervisor isn't cooperating with anybody. He knows his standing orders call for getting that finished product over to the next department at a certain time and he obeys those orders to the letter. There is not an ounce of cooperation in this.

Cooperation, as most groups of supervisors define the act, consists of going beyond the line of duty to do someone else a favor. This someone may be the big boss, a brother supervisor, or a subordinate. On the

other hand, most supervisors concede that they must somehow *win* cooperation of this same type from executives, special departments, other supervisors, and even from their own subordinates.



"Cooperation . . . consists of going beyond the line of duty to do someone else a favor."

Sometimes I meet supervisors who can see the need of cooperating wholeheartedly with brother foremen and their superiors, but these men will say "Why should I cooperate with my subordinates?"

They're getting paid to do what I tell them to do, and that's all there is to it."

This situation works well until the inevitable day comes when *this supervisor's success may depend upon the extent to which his work force will put out exceptional effort, beyond the line of duty, to help him meet exceptional situations.*

As often as not, these demands come down from above with the greatest of emphasis and urgency, and may even be occasioned by some national emergency of which the supervisor cannot even be informed. Yet the schedules must be met, and they can only be adhered to if every man in the department is willing to put extra effort into his work in order to increase output during this emergency. In the future we may see even greater need for this type of cooper-

ation, between worker and supervisor.

At such a time, writing a memorandum is just a waste of time. The foreman must explain the situation directly to each man as far as he understands it, and ask for that extra ounce of effort that spells genuine cooperation. He cannot demand it, nor can he beg for it. But he must somehow get it if he is going to continue to look good in the front office.

What happens then will depend to a large extent on how he has treated these subordinates when the heat was not on him. If he has taken the trouble to look out for their interests at all times, even at the expense of sometimes making himself somewhat unpopular with his superiors, he has every right to expect reciprocal cooperation from his workers in a period of emergency.

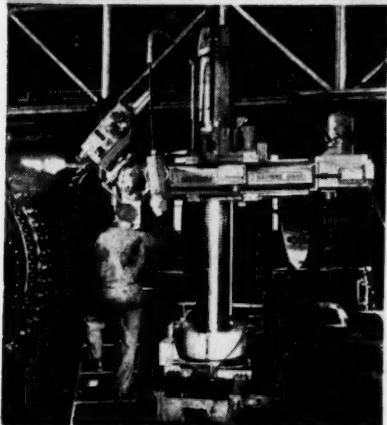
If he is the right sort of supervisor, it is not even necessary for him to tell his subordinates what the trouble is. Frequently he may himself not know exactly what all the shooting is about, but he has sufficient confidence in his management to know that this extra effort would not be requested unless there was a genuine need for it.



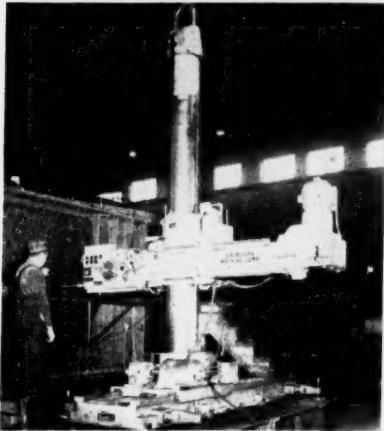
" . . . this supervisor's success may depend upon the extent to which his work force will put out exceptional effort, beyond the line of duty, to help him meet exceptional situations."

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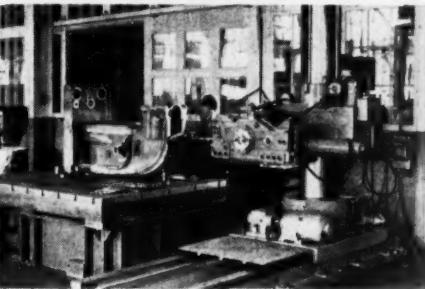
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In working as a consultant in many plants, you soon come to sense the degree of cooperation existing therein, almost as soon as you first

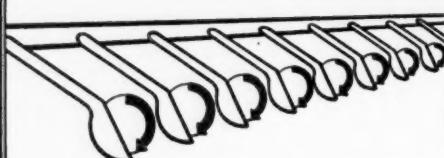
enter the factory. A superintendent may tip off the situation by saying "I don't care whether my men cooperate or not, so long as they do exactly what they are told."

Or, a foreman in speaking of a brother supervisor, may casually say "Sure I know he's in a jam, but that's no skin off my nose. Let him get out of it any way he can. That's the way I have to do it."

Then, when you talk to the workers, they say "Listen, I just work here. I put in my time and draw my pay. If my boss is in trouble that's his hard luck. He never yet has helped me when I had troubles of my own."

Nowadays, both foremen and workers are more intelligent than they were a quarter-century ago. Yet even today you run into some

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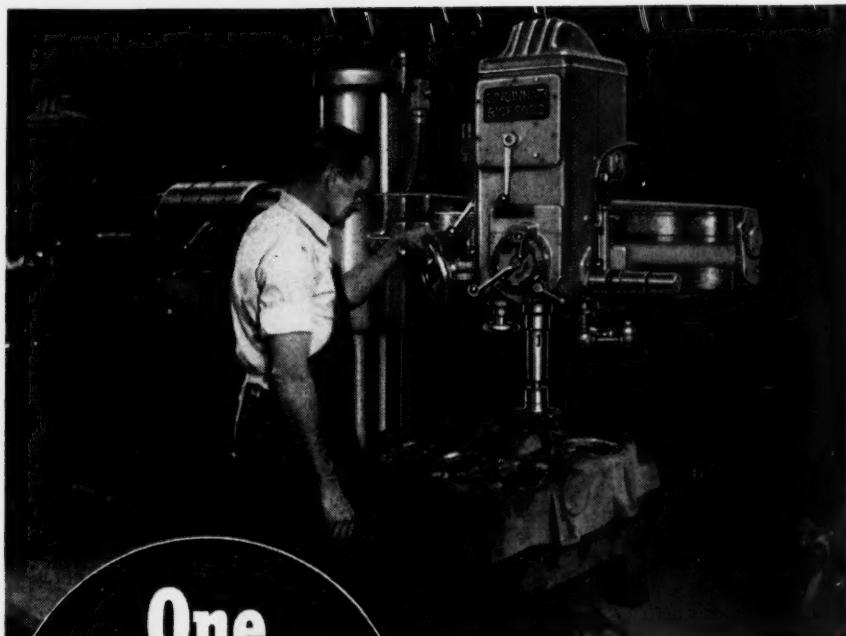
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amazing instances of shortsightedness in this matter of cooperation and they create havoc in a number of directions.

Most foremen, in discussing this matter, agree that it is easiest to cooperate with their bosses, if only for purely selfish reasons. They also agree that it is most difficult to cooperate intelligently with supervisors of equal rank, since they are

frank in stating that these men, in a sense, are all in competition for the better jobs ahead and therefore may be inclined to feel resentment toward one another.

However, a majority of foremen concede that throat-cutting of a brother supervisor gets no one anywhere. Here again, a foreman sooner or later finds he is going to need all the help he can get from these other foremen, and much of this assistance must rate as "beyond the line of duty." If he has been negligent in going out of his way to assist the other fellow, he need not expect much help from that man at such a time as this.

Frequently I have asked foremen groups "How can an uncooperative supervisor be taught the value of true cooperation?" The reply sometimes is in rather harsh, sharp terms. Someone may say "If we all just quit cooperating with that guy, he will soon learn that he must cooperate—or else."

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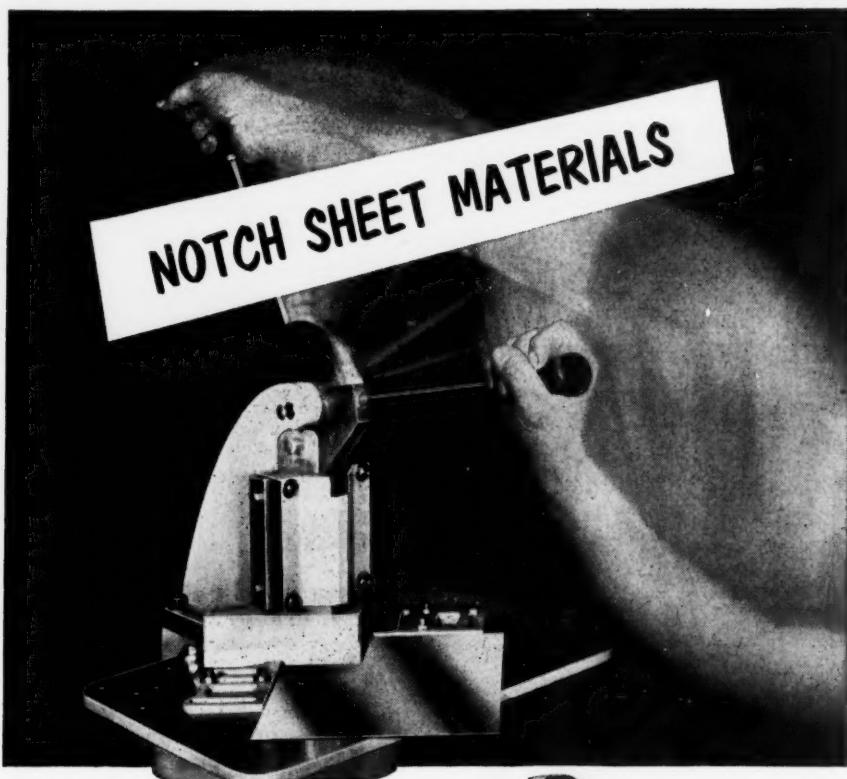
Without question, this line of reasoning sounds inviting when we are dealing with some Old Scrooge who wouldn't even tip you off if your department was on fire. Yet these same foremen eventually agree that nothing can be gained by ganging up on the uncooperative supervisor. If you really are sold on cooperation, you must continue practicing it, even with such a fellow as this. Eventually, they say, some situation will arise in which the difficult one will find it imperative to secure complete cooperation from everyone, and thereafter he will appreciate the necessity of going out of his way to help others. Most of us have seen exactly this thing happen in our own plants.

I have said that cooperation works both ways: that is, as between the workers and the supervisors, and between supervisors of equal rank. A number of times I have witnessed instances in which *these two forms of cooperation — vertical and horizontal — come into direct conflict*.

One such case caused quite a furor in a factory in Illinois. Here the situation was about like this: The foremen got together on the quiet and worked out certain routines that would make their own work easier. But these routines were not in the



"...these two
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—vertical and horizontal—come into
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best interests of the plant as a whole, and the plant superintendent was not let in on the new setup.

Inevitably, however, he soon stumbled across the situation, and at once there was a real ruckus in that factory. The superintendent contended that he could not run his job if his subordinate supervisors were to gang up against him and make their own regulations. Fortunately he was a man of vision and possessed a real sense of humor. He gave all of the

foremen a gentle bawling out, broke up the *sub rosa* practices, and thereby regained control of the factory. Some executives would have gone much farther than that if they had discovered such a setup in operation without their knowledge or consent. But this man handled the situation well, and no attempt was ever made to short circuit his authority again.

Of course the executive was in the right in this instance. It is his job to set up procedures and see that these

are put into effect. If conflicting routines are worked out without his knowledge, he is not receiving proper cooperation, and in some instances he might find it necessary to take severe disciplinary action against the offenders.

There are other occasions when cooperation may be found to have backfired. One is the not too unusual instance of the foreman who will cooperate 100 per cent with his boss—probably the general foreman—but with no one else. This is bound to



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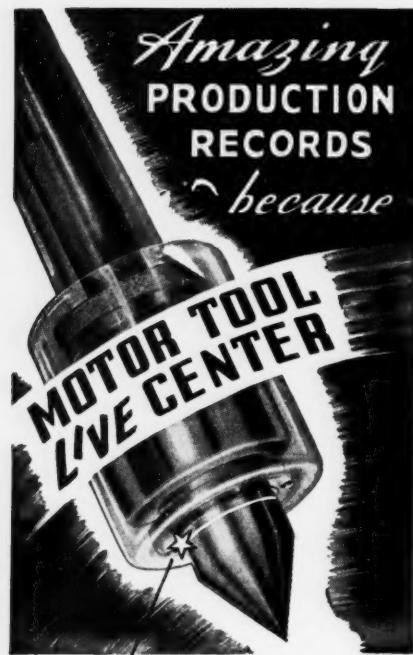
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result in trouble sooner or later, because such a foreman may well work against the best interests of his subordinates and his brother supervisors in order to make the best possible impression on the head man.

Then again, there exists that curious type of cooperation sometimes met with in a factory, in which a



such a foreman may well work against the best interests of his subordinates and his brother supervisors in order to make the best possible impression on the head man."

foreman is wholly loyal to his subordinates, and these people in turn stand ready to do anything for him. But this supervisor happens not to like his own superiors and also refuses flatly to cooperate with the foremen of other departments or of special service groups—such as safety, training, medical, and so on.

The result here is that this foreman has created what amounts to a sort of little kingdom all his own within that factory, and this man's superiors may have quite a time straightening matters out without

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antagonizing all of the foreman's loyal subordinates. In some instances I have seen this situation go to such lengths that it was necessary to remove the foreman from his job before it was possible to break up such a departmental clique.

As I have said, you sense something of the degree of genuine cooperation existing in any plant the

minute you enter it for the first time. I have had a general manager tell me frankly that he simply did not like the men working for him—that he considered the entire working force a selfish, stupid bunch of malingeringers. This is a rare case, but when it is encountered, the big boss probably doesn't even like his supervisory force, and he never has a good word to say for his superiors or his board of directors.

It is difficult to see how such a plant can get out adequate production, no matter how fine the tools and machines happen to be or how efficient the workmen are. *If a superintendent of this close-minded type gets charge of things, the men are justified in saying flatly "We're working in a madhouse."* I have encountered perhaps four such organizations in a lifetime, and in each of these I have never found a single genuinely satisfied employee or supervisor.



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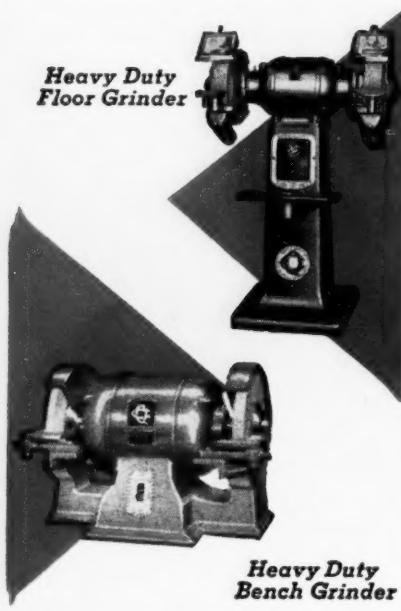
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Fortunately, management seldom keeps such a man in a position of great responsibility for any length of time. He not only creates discord everywhere, but production schedules cannot possibly be met. He cooperates with no one, neither does he encourage anyone to cooperate with him. The chances are such a man never can be brought to realize his shortcomings. Neither can he be demoted to a lesser job without stir-



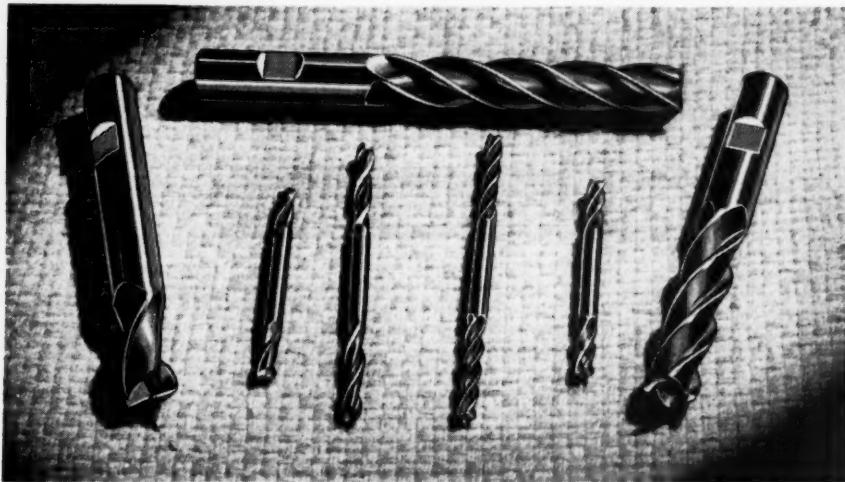
"If a superintendent of this closed-minded type gets charge of things, the men are justified in saying flatly "We're working in a madhouse."

ring up a hornet's nest in the department of which he is given charge. The only solution to this problem that appears satisfactory to a group of supervisors or executives discussing it is to detach the gentleman from the payroll, and without loss of time.

On the other hand, in a governmental bureau I once witnessed something along the same line, but the big boss was not the one at fault. In this instance the trouble centered about his young and ambitious right-hand man, the assistant general manager.

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This individual was a brilliant engineer, but he had been shoved ahead too fast and success had gone to his head. He conceived the clever idea of instituting a sort of revolution, with the intention of getting for himself the job of his boss, the general manager. He almost succeeded in this, too. It was not until more than half of the division heads of that bureau were lined up with him

in this project that the general manager found out what was going on. Then, the boss succeeded in getting his over-zealous assistant fired—not an easy thing to do under civil service regulations—and even thereafter for a full year there was an enormous amount of friction between the head man and certain of his division heads.

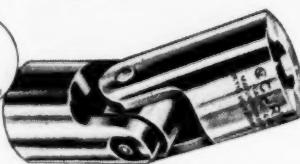
Of course this was an unusual case, but when there occurs such friction any place down the line from the top, the entire working force is likely to become infected with dissatisfaction. It is only natural for every worker to take sides in such an open controversy, and this is particularly true when two division heads are openly at odds with each other. Here, the men usually are loyal to their own boss and may become equally hostile to the employees of that other boss. This situation can cost a big company millions in production delays, fights, and gen-

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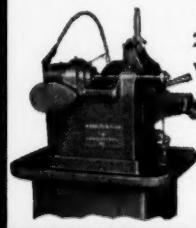
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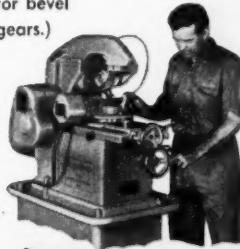
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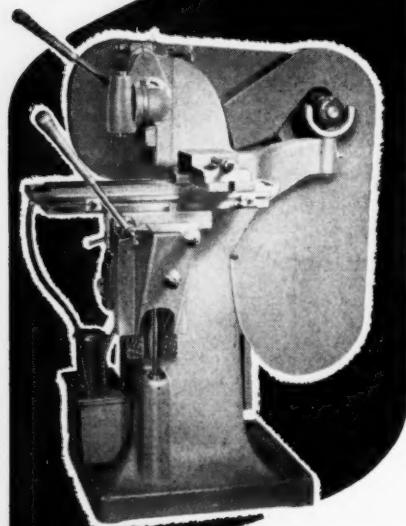
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eral efforts to hamstring the efforts of the other fellow. Also, as every supervisor knows, this sort of thing tends to increase the severity and frequency of employee injuries.

Fortunately, as I have said, the average general manager is smart enough to appreciate that he must set the example for his entire organization. He must cooperate with each of his lieutenants in such fashion as



"... and they always stand ready to put out a greater degree of effort to help the big boss get past a tough assignment."

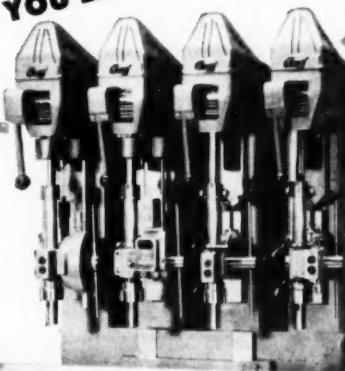
to display no trace of favoritism toward anyone. He must be forever ready to go out of his way to help anyone.

In turn, in such a shop, the division heads will feel like doing favors for each other and for their subordinates—favors beyond the line of duty. They also expect such treatment from other supervisors and from those reporting to them, and they always stand ready to put out a greater degree of effort to help the big boss get past a tough assignment.

When you visit such a plant as this you sense the spirit of cooperation that exists, both vertical and

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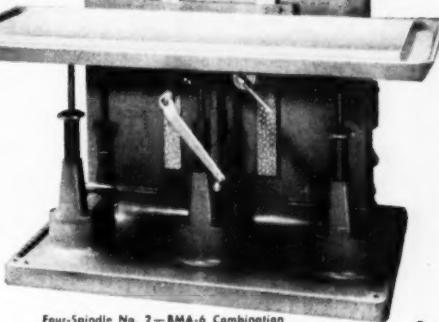
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"In such a plant, cooperation is really at work, and it has a powerful effect on production figures."

horizontal, from the moment you first enter the shop. Everybody is hustling, nobody appears sore at anybody else, and all hands seem to be working in harmony to get out maximum production. Above all, you quickly note that no one

is attempting to justify his unfair actions by knocking someone else who, according to his story, is trying to undercut him. You see a minimum of short circuiting of the authority of subordinate supervisors

by the superintendent. And every foreman has a good word to say, both for his boss and for the workmen reporting to him.

In such a plant, cooperation is really at work, and it has a powerful effect on production figures. It is something you cannot buy, neither can you secure it by issuing an executive order. It is based on honest day-by-day relationships between men and supervisor, between brother supervisors, and between supervisors, superintendents, and topflight executives. When you visit such a plant, you leave feeling that everything there is as it should be, from top to bottom.

Even in such a desirable situation, there is nothing to prevent the big boss from circulating among his workers, watching different ones

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turning out production, and occasionally patting somebody on the back. But this head man should never directly criticize a workman; rather he should go through that worker's foreman or general foreman if he sees anything that calls for reprimand or change of procedure.

I like to see a general manager personally go through his shops and see for himself what a great job his men are doing. The workers in turn become accustomed to seeing him about and feel that he is not just checking up on them, but is genuinely interested in what they are doing. In every case where I have seen this practice in effect, morale in that plant has been high.

Once, in a great Chicago packing plant, I saw the president thus visit each of his departments, and occa-

sionally he would reach out and take a slice of some prepared food like baked ham and eat it with every indication of enjoyment. He contended to me that not only thus could he be positive of the quality of the product his plant was turning out, but he also made the operator feel good, and he did not hesitate to tell the man or woman that the product was really tasty.

Such small touches serve to increase cooperation, even when they relate to the dealings between a foreman and his men. Continued back-slapping gets to be monotonous, and certainly cannot be sincere. But an occasional pat on the back is relished by all of us, and this is the sort of lubrication that prevents the development of friction in any plant, day in and day out.

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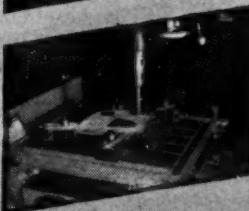
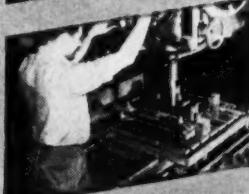
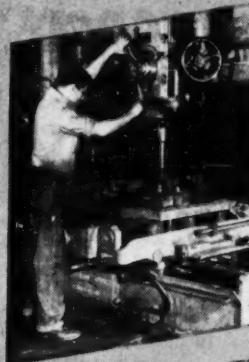
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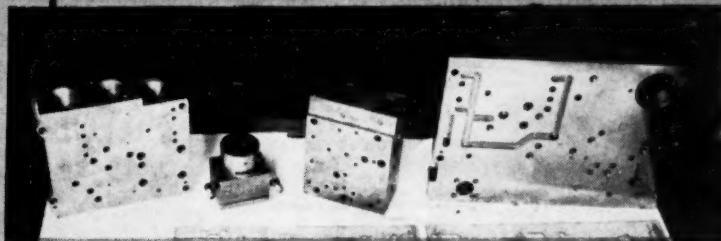
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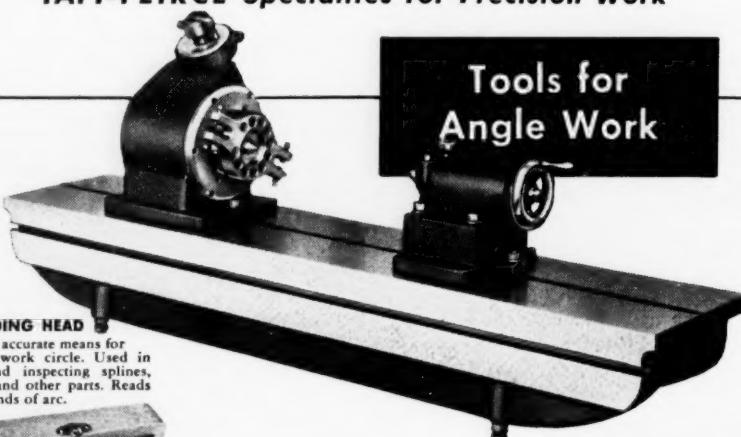
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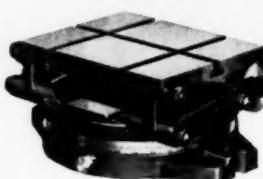
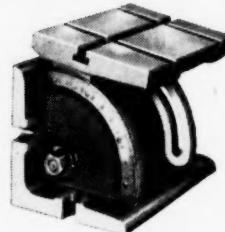


T-P ANGLE BLOCKS

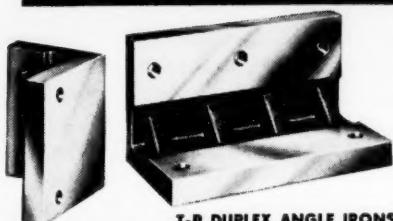
speed setup and grinding of small angular work on a magnetic chuck. Can be used individually or in any combination to form V-blocks.

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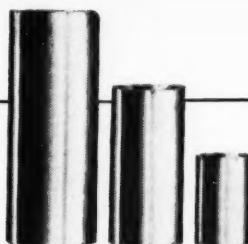
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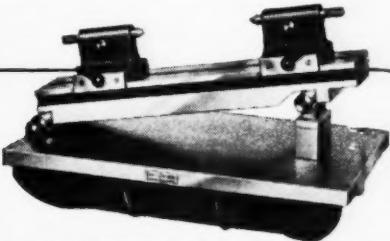
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ideas from readers

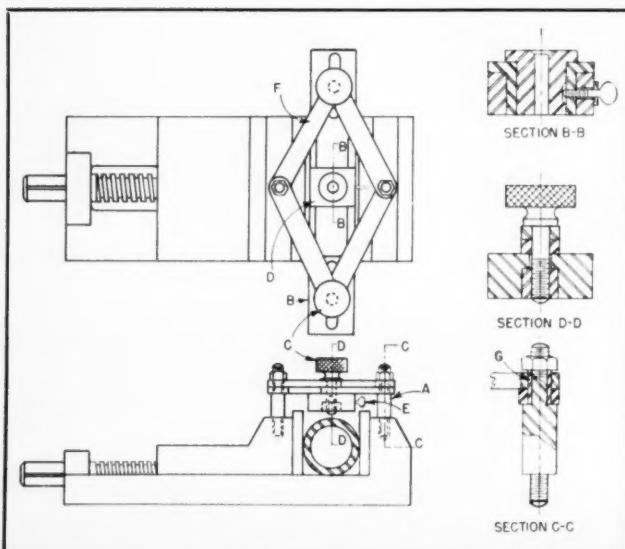
Self-Centering Drill-Vise Jig

By C. H. WINTERBURN

THE writer has found that layout time can be eliminated when drilling holes in work held in a standard drill vise by the use of a self-centering drill-vise jig of the type shown in the accompanying drawing. Designed so as to be adaptable to all types of commonly used drill vises, the jig is

mounted on the vise by means of two studs, **A**, which are screwed into the vise body or fixed jaw member and the moving member or jaw. The tapped holes for the mounting studs are equidistant from the face of the jaw in each case. The size of the mounting studs and tapped holes is determined by the size of the vise to which the jig is attached.

The beam, **B**, of the jig has elongated holes of sufficient length to accommodate the full open position of the vise. The beam lock screws **C** hold the jig rigid after proper clamping of the work. The lateral slide-bushing retainer **D** is free to move the entire width of the vise and may be lock-



Drawing of self-centering drill-vise jig as applied to ordinary drill vise

ed at any point. Several slide-bushing retainers may be used, if desired, for multiple hole locations. The limit of the drill size is determined by the width of the beam used. The lateral slide lock screw **E** serves a dual purpose; first, to lock the lateral slide in the desired position and, second, to keep the drill bushing from turning in the bushing retainer. As many bushings as desired may be quickly interchanged by loosening the slide lock screw.

The four supporting arms, **F**, of the jig should be as large as possible to assure rigidity. The sleeve **G** must be a close tolerance fit to both the supporting arms and the mounting studs. To remove the jig from the vise, the hex nuts on the mounting studs are removed and the entire assembly is lifted off the studs. The mounting studs may then be removed if desired.

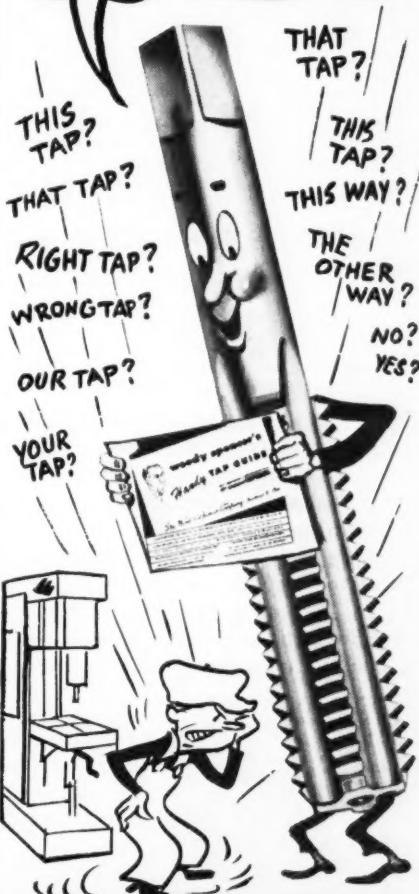
Additions, not shown in the drawing, may include such items as measurement graduations marked along the beam to facilitate moving of the slide-bushing retainer to several locations, and a spring-loaded center punch to fit in the drill bushing hole for drill locating where guided drilling is not necessary.

Shaping Blind-End Keyways

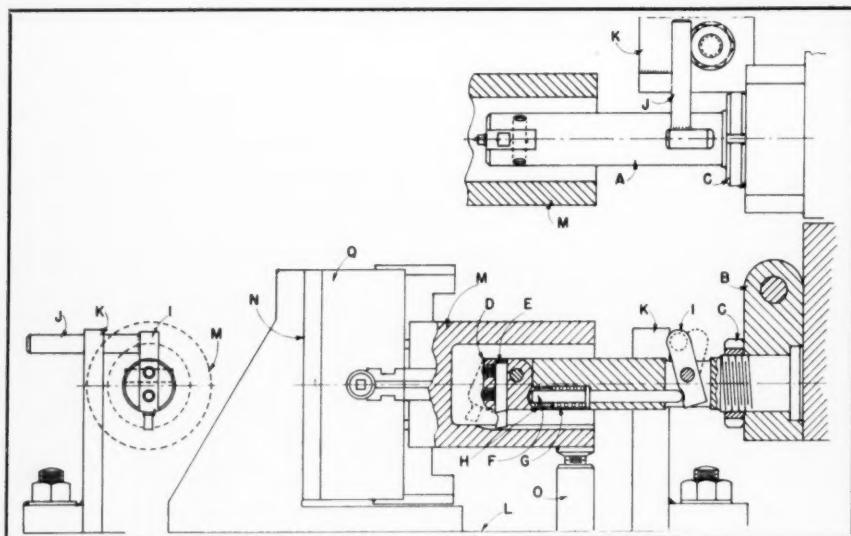
By F. E. RILEY
England

IT has been our experience that the shaper is an effective machine for cutting keyways and splines, or any other straight-line shape, provided the shaping tool can be operated the full length of the surface so that the cut runs off the workpiece at both ends. When slotting or shaping an internal keyway, it is generally necessary to

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The Wood & Spencer Company
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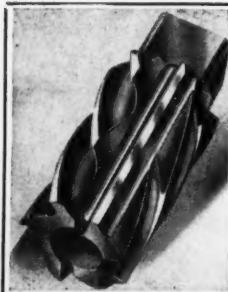


Sketch showing setup for shaping blind-end keyway in sleeve-shaped workpiece

undercut the work so that an internal groove is provided into which the shaping tool may run at the end of its stroke. Similarly, if blind-end grooves are to be shaped on the outside of a workpiece, it is customary to drill a hole in the work at the position of the groove end so that the shaping or slotting tool may be run into this opening.

In one small manufacturing firm with which the writer was associated, consultation with the product designer

indicated that a product would be improved considerably if a blind-end internal keyway could be cut in the sleeve-shaped component. The end of the keyway could have a runout at its inner end of gradually diminishing depth. To handle this job, an internal shaping tool, as shown in the accompanying sketch, was designed. The action of the tool is such that at the end of the cut, the shaping tool pivots and is lifted out of the work surface.



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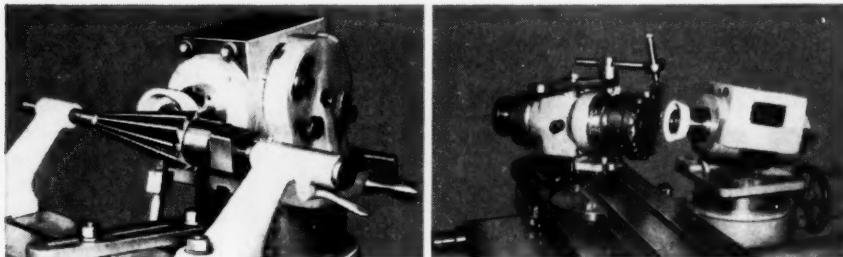
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5. All clearance angles read directly in degrees from the scale provided on the head. Mistakes on clearance angles are avoided.
6. The right clearance angle is assured on tools difficult to grind, such as slab mills, taper reamers, angular cutters and form tools.
7. 3600 R.P.M. — one wheel speed — safe for all wheels generally used on cutter grinders. Heat checking of cutters is virtually eliminated.
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To use the shaping tool, the standard toolholder is removed from the shaping machine clapper block, **B**, and replaced by a special tool bar, **A**, which is fastened in position by means of ring-shaped nut, **C**, that can be tightened by means of a C-spanner. The outer end of the tool bar is slotted vertically to accommodate a small pivoting tool block, **D**, which has a vertical square hole therein for holding a

standard high speed steel tool bit, **E**. The tool block operates in a manner similar to that of a miniature clapper block and is free to pivot upon a horizontal pin.

To pivot the tool block about the pin and thereby lift the shaping tool out of the work, a push rod, **F**, is incorporated in the tool bar. The push rod is held away from the tool block during the cutting stroke by means of a compression spring, **G**, locked in a pocket in the bar by means of a threaded plug, **H**. Close to the shaping machine clapper block is a vertical slot cut diametrically through the tool bar. This slot contains a pivoted lever, **I**, the upper end of which includes an extended striker arm, **J**. The lower end of the lever is in contact with the end of the push rod **F** so that when the upper end of the lever is pushed to the right, the lower end moves leftward and pivots the tool block upward, lifting the tool out of the work surface.

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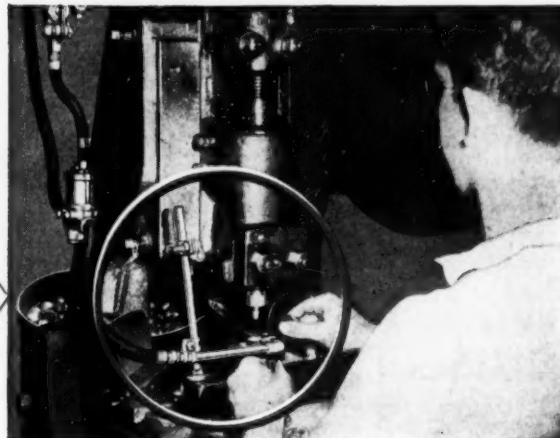
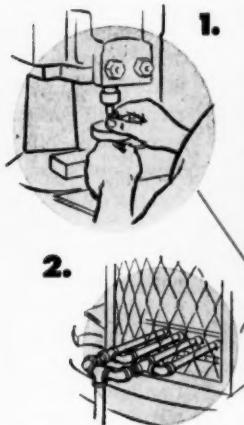
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arm on the lever, a striking block **K**, is fastened to the shaping machine table, **L**. This block is adjustable so that its engagement with the striking arm can be arranged to suit various lengths of shaper stroke. By careful setting of the shaper ram stroke, it is possible to arrange for the shaping tool to be just clear of the work surface at the point of ram reversal. The workpiece, **M**, is mounted in a chuck, **Q**, and simple dividing head, **N**, having a slotted index-

ing plate and a single indexing pin. The overhanging portion of the workpiece is supported by means of a screw jack, **O**.

Second-Operation Fixtures for Turret Lathes

By H. G. FROMMER

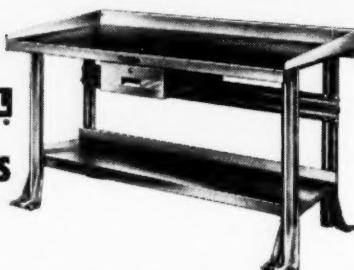
WHEN designing second-operation fixtures, several factors must be

taken into consideration in order to arrive at the most economical design and to assure the required accuracy. The type of machine, size of workpiece, dimensional accuracy, and concentricity are but a few points to be considered. A practical setup for the frequent use of second-operation fixtures on large or medium size turret lathes includes the adaptation of a faceplate as a fixture carrier. To adapt the faceplate thusly, it should be faced carefully and bored accurately through the center. A hardened and ground bushing is then pressed into the

standardize on standard

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Boye & Emmes standard headstock with cover removed, showing constant mesh, wide face gears and large diameter, positive jaw, sliding clutches.

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After 25 Years

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Timken purchased repair parts from us, for this machine, to the extent of \$154.15. Yet, when the headstock cover was removed at the factory the gearing was found to be "as good as new." This is usual.

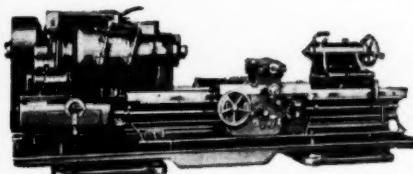
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POSITIVE JAW SLIDING CLUTCHES
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The principle of power transmission which is used in Boye & Emmes Engine Lathes incorporates constant mesh headstock gearing, with speed changes effected through positive jaw, sliding

clutches. This construction eliminates gear wear due to shifting action, allows shorter shafts, less space between bearings, and hence more accurate and rigid construction.

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If you are not now using Boye & Emmes Long Life Engine Lathes, investigate. Compare this lathe of low maintenance and high accuracy from every viewpoint. Specifications and details of construction for all sizes are contained in our free Bulletin No. 601. Write for it today!



*One of many documented cases of "no wear" in Boye & Emmes constant mesh lathe headstock, after years of use.



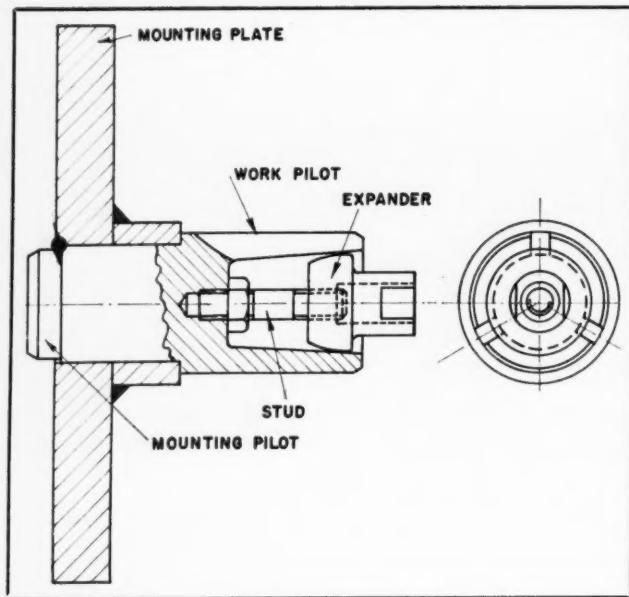


Fig. 1 — This sketch shows an expansion type of second-operation fixture designed to provide a high degree of concentricity of the machined surfaces of the workpieces.

ing pilot of a size to fit the faceplate bushing extends through the center of the mounting plate. Often, the other end of the mounting pilot serves as a workpiece pilot.

Figure 1 shows an expansion type

fixture designed to provide a high degree of concentricity of the machined surfaces of the workpieces. The work pilot is machined to include a tapered counterbore with a flat bottom, into which a hole is drilled and threaded to accommodate a stud, which is locked with a nut. Three slots situated 120 degrees apart or six slots at 60 degrees are then machined into the work pilot in such a manner that they do not

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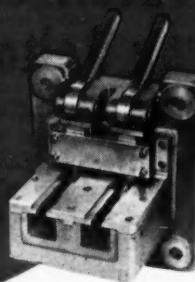


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Below: Two-station, cam-type
clamping fixture guides broaches
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quite break through. After carburizing, hardening and grinding of the pilot, these slots are ground through. An expander with wrench flats is inserted over the stud and the fixture is ready for use. Slight pressure against the inside taper surface expands the pilot and locks the work firmly and concentrically.

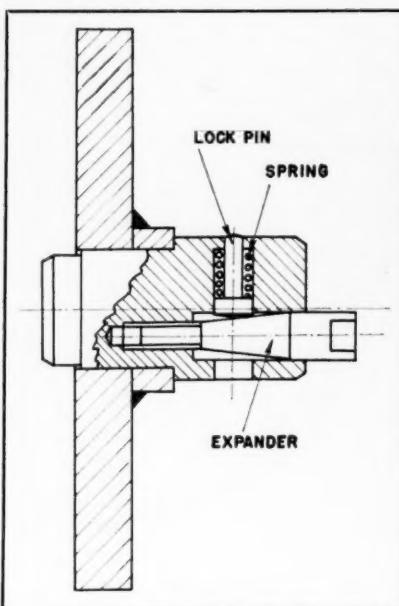


Fig. 2 — When concentricity is no particular problem and when the hole dimensions of the workpiece do not have a very close tolerance, a fixture of the design shown herewith is more economical than a fixture of the type shown in Fig. 1.

When concentricity is no particular problem and when the hole dimensions of the workpiece do not have a very close tolerance, a fixture such as shown in Fig. 2 is more economical. In this case, a tapered expander actuates a spring-loaded pin. If more concentricity is desired, three such pins at 120°



NEW LINCOLN PLANT LOCATED BY INCENTIVE INSPIRED CO-ACTION IN REDEFINING POSSIBILITIES IN PROGRESS
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"Fleetwelder", available in
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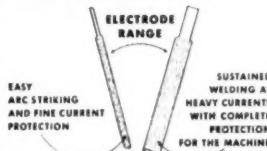
LOOK at the sketch. It shows how you benefit through "Fleetwelder's" wide current range in which maximum welding currents are 15 times minimum current values.

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October, 1953

11 WAYS to cut AC welding costs

DESIGNED for faster, simpler, more efficient welding, Lincoln's "Fleetwelder" saves money on every AC job. Here's how:

1. SELLS FOR LESS—Built with Lincoln incentive production methods, "Fleetwelder's" low selling price gives more range, longer service, easier, faster operation, greater dependability for the dollar... to cut your AC welding costs.

2. Complete Overload Protection—Built with generous reserve capacity for long sustained output at high currents, "Fleetwelder" is completely protected against damage due to overheating by a thermostatic controlled magnetic starter... a feature exclusive with Lincoln.

3. Exclusive "Arc-Booster"—Pioneered by Lincoln, the exclusive "Arc-Booster" blasts the end of the electrode with extra amps for an instant when the electrode touches the work to start the arc automatically. Ideal in out-of-position welding.

4. Completely Safe—No high frequency devices as on some welders to help arc starting. Open circuit voltage is only 71 volts. Output terminal panel recessed to eliminate accidental shorting of leads.

5. "Low Voltage" Safety Relays available for special work. (Optional extra.)

6. Takes Less Power—"Fleetwelder" draws less amps in idle current than required for other AC welders. Inbuilt power factor is higher. Has pilot light to indicate power is on.

7. Low Maintenance—Ventilated from the top, "Fleetwelder" operates cleaner... needs less attention. Coils are permanently anchored, cannot become loosened to wear the insulation and short out. Easy accessibility to all working parts.

8. Current Stays Set—Once set, current settings do not change... are "locked" in position by rugged drum type holding devices. Illuminated dial shows setting of welding current.

9. Steady Arc—"Fleetwelder's" reactor control is a free circuit designed for high responsiveness to changing arc conditions.

10. Compact, Portable—Only 35" high, 22" x 26" at base, "Fleetwelder" requires less space. Has connection for simple hookup to 220 or 440 volt line. Can be furnished with three wheel undercarriage for moving around the shop.

11. Instant Penetration—The extra current for arc striking also gives complete penetration at once... no more cold overlaps or partial penetration at the start of the weld.

degree spacing may be used. In the latter case, the expander would be located along the axis of the pilot, thereby limiting the minimum size of the pilot so that the design would have to be modified for small diameters. Figure 3 shows this modification. Instead of an internal spring-loaded pin, a short straight pin is employed. This pin is grooved on its top surface. The pilot is also grooved to accommodate

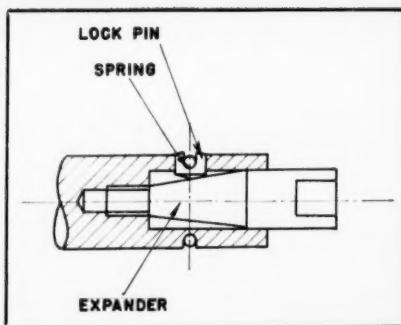


Fig. 3—This sketch shows a modification of the fixture shown in Fig. 2.



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an expansion spring which is hooked to itself to form an "endless" spring. Obviously, it is absolutely necessary to make the grooving deep enough to prevent the spring from hindering the insertion of the workpiece over the pilot.

Method for Pressing Long Bushings into Soft Metal Blocks

By CLIFF BOSSMANN

RECENTLY, we encountered difficulty in pressing long bushings into soft metal blocks. The holes into which the bushings were pressed

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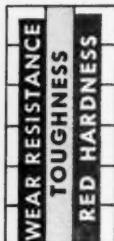
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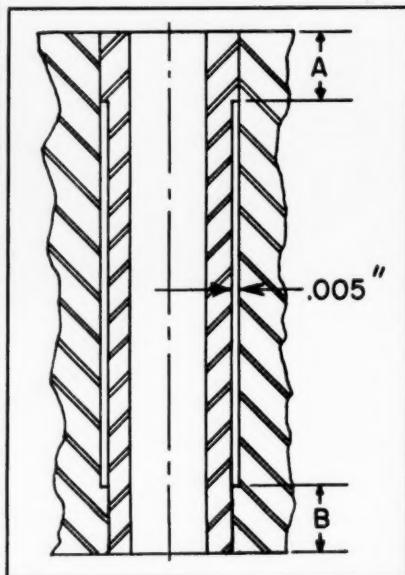


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would invariably gall and throw the bushings out of alignment.

To eliminate this condition, we undercut each bushing 0.005 inch, producing the shoulder **A**, as shown in the accompanying sketch. The hole into which the bushing was to be inserted was counterbored, producing the shoulder **B**. Thus, the shoulders **A** and **B** provided press fits for the ends of



Sketch showing method how long bushing can be accurately press fitted in soft metal block without galling

the bushing so that the bushing remained in accurate alignment after insertion in the soft metal block.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

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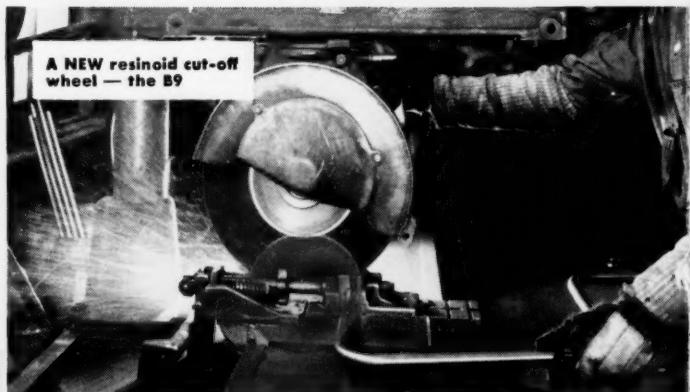
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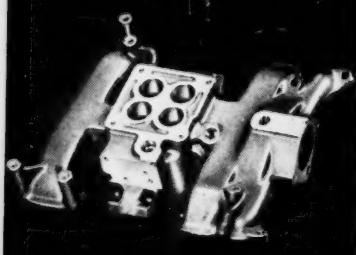
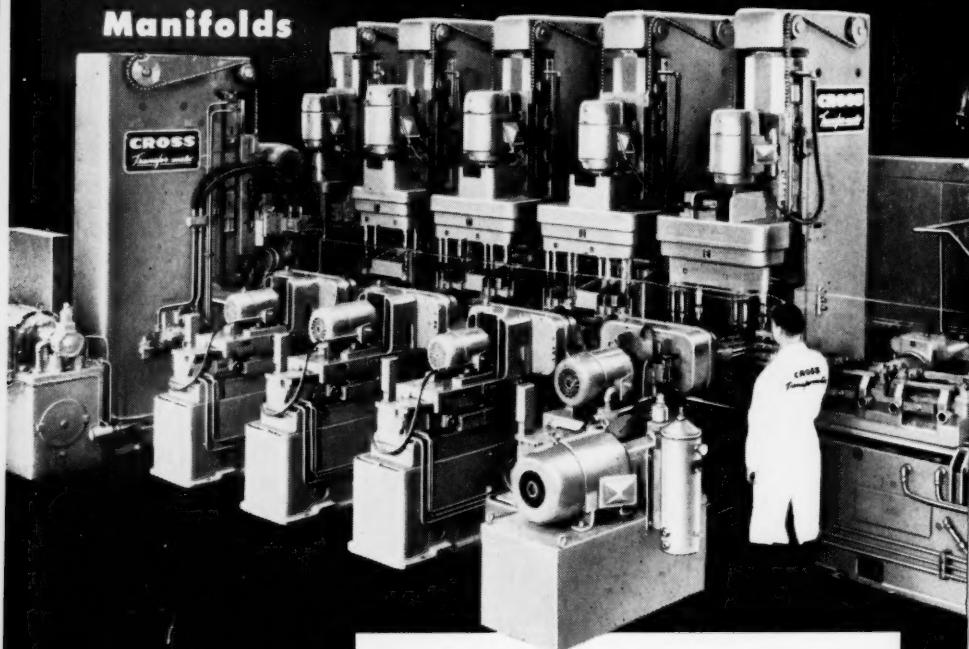


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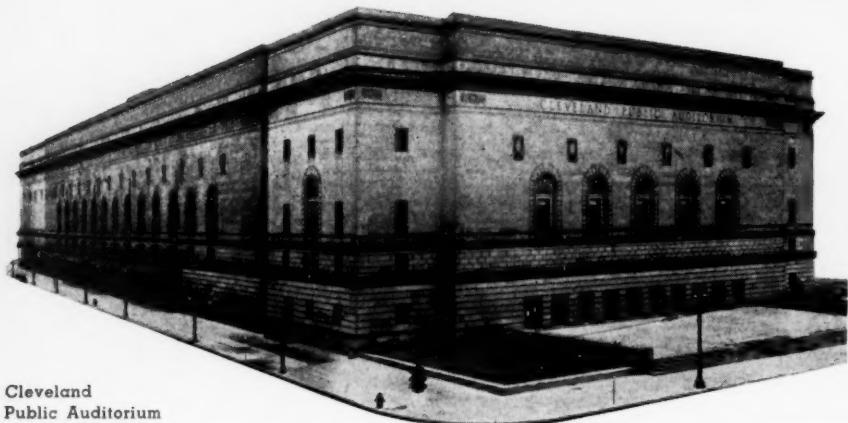
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35th National Metal Congress and Exposition

CLEVELAND will be the 1953 host to the four participating societies who will cooperate in presenting the 35th National Metal Congress and Exposition which is to be held in the city October 17 to 23, inclusive. The four societies are the American Society for Metals, American Welding Society, Metals Institute Division of the Institute of Mining and Metallurgical Engineers, and the Society for Non-Destructive Testing.

The primary purpose of the Annual Metal Congress and Exposition is to bring together the experience, the knowledge, and the means for a more effective use of metals in the making of products for civilian use and for the making of products that will ensure our defense against aggression and thus guarantee our security and liberty.

Exhibits

Over 400 nationally-known firms engaged in either the production of metals, the treatment of metals, the fabrication of metals into component parts or products, or in rendering services to all of these fields will have exhibits. Nearly five acres of floor space will be devoted to exhibits. In addition, thousands of square feet of floor space will be utilized for special meetings, forums, lectures and other activities.

Technical Programs

The four sponsoring societies, through their scheduled seminars, lecture sessions, and meetings on technical subjects pertaining to metals production, treating, and processing, will provide the National Metal Congress and Exposition visitors with daily opportunity to hear vital technical subjects discussed and analyzed by some of the world's leading engineers and teachers. The American Society for Metals will hold its annual seminar on Saturday morning and afternoon, and Sunday morning and afternoon, October 17-18. Subject of the 1953 ASM

seminar is "Relation of Properties to Microstructure." Through the week of the Metal Congress, the American Society for Metals and the American Welding Society will hold morning, afternoon and evening technical meetings. The Institute of Metals Division, American Institute of Mining and Metallurgical Engineers, will hold daily and evening technical sessions Monday through Wednesday. The Society for Non-Destructive Testing will hold morning and afternoon sessions Monday through Thursday.

ASM Metallographic Exhibit

The eighth Metallographic Exhibit of the American Society for Metals will be held at the National Metal Congress and Exposition in Cleveland, Ohio, during the week of October 19-23, 1953. A large area within the Cleveland Public Auditorium, scene of the "Metal Show," has been reserved so that displays of the Metallographic Exhibit can be shown to best advantage. Work which has appeared in previous ASM Metallographic exhibits is not acceptable.

Eleven classifications of micros are designated for the contest, including tool steels and tool materials; stainless and heat resisting steels; other steels and irons; aluminum, magnesium, beryllium, titanium and their alloys; copper, zinc, lead, nickel and their alloys; metals and alloys not otherwise classified; series showing transitions or changes during processing; surface phenomena; results by unconventional techniques (other than electron micrographs); slags, oxides and inclusions; welds and other joining methods.

A committee of judges, appointed by the Metal Congress management, will award a first prize (medal and blue ribbon) to the best entry in each classification. Honorable mention with appropriate medal will be awarded to those closely approaching these winners. A Grand Prize (engraved certificate and \$100 cash) will be presented to the exhibitor whose entry is adjudged best in the show. The Grand Prize entry becomes the property of the American Society for Metals for preservation and display in the Society's National Headquarters.

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ASM Seminar on Relation of Properties to Microstructure

Technical Sessions at the Hotel Statler

Saturday, October 17—9:30 A.M.

Structure and Structure Sensitive Properties—By J. H. Hollomon, Manager, Metallurgy Research Department, General Electric Laboratory, Schenectady, N. Y.

The Effect of Grain Boundaries on Mechanical Properties—By M. Gensamer, Professor of Metallurgical Engineering, School of Mines, Columbia University, New York, N. Y.

Principles of Solution Hardening—By R. E. Parker, Professor of Metallurgy, University of California, Berkeley, Calif., and T. Hazlett, University of California.

Saturday, October 17—2:00 P.M.

Effect of Dispersion on Mechanical Properties—By J. E. Dorn, Professor, Physical Metallurgy, and C. D. Starr, University of California, Berkeley, Calif.

Theory of Dispersion Hardening—By E. W. Hart, Research Associate, General Electric Research Laboratory, Schenectady, N. Y.

Structure and Alloy Design—By A. D. Schwope, Research Supervisor, Metallurgical Engineering, Battelle Memorial Institute, Columbus, Ohio.

Saturday, October 17—8:00 P.M.

The Interaction of Dislocations with Solute Atoms—By A. H. Cottrell, Professor of Physical Metallurgy, The University, Birmingham, England.

Sunday, October 18—9:30 A.M.

The Relation of Fracture to Microstructure—By J. R. Low, Research Associate, General Electric Research Laboratory, Schenectady, N. Y.

The Strength of Glass Reinforced Structures—By G. Slayter, Vice President, Research and Development, Owens-Corning Fiberglas Corporation, Newark, Ohio.

The Relation of Corrosion to Microstructure—By H. H. Uhlig, Professor of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Sunday, October 18—2:00 P.M.

Theory of the Relation of Magnetic Properties to Microstructure—By L. J. Dijkstra, Research Laboratories, Westinghouse Electric Corporation, East Pittsburgh, Pa.

Structure and Coercivity—By J. Libsch, Associate Professor of Metallurgy, Lehigh University, Bethlehem, Pa., and G. Conrad, Assistant Director of Magnetic Materials Laboratory, Lehigh University, Bethlehem, Pa.



Program of ASM Technical Papers

Technical Sessions at Hotel Statler

Monday, October 19—9:30 A.M.

Titanium and Molybdenum

Determination of Oxygen in Titanium and Zirconium by the Isotopic Method—By A. D. Kirshenbaum, R. A. Mossman and A. V. Grosse, Research Institute of Temple University, Philadelphia.

Vacuum-Fusion Analysis of Molybdenum—By M. W. Mallett, Assistant Supervisor, Thermal Chemistry Group, and C. B. Griffith, Battelle Memorial Institute, Columbus, Ohio.

Nitriding of Titanium with Ammonia—By J. L. Wyatt, Assistant to Technical Manager, Horizons, Inc., Cleveland, and N. J. Grant, Associate Professor of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Heat Treatment of High-Strength, Titanium-Base Alloys—By W. M. Parris, Engineer, P. D. Frost, Assistant Supervisor, and J. H. Jackson, Supervisor, Battelle Memorial Institute, Columbus, Ohio.

Monday, October 19—2:00 P.M.

Titanium

Transformation Kinetics and Mechanical Properties of Titanium-Aluminum-Molybdenum Alloys—By H. D. Kessler, Supervisor, Nonferrous Metals Research, and M. Hansen, Chairman, Metals Research, Armour Research Foundation, Chicago.

Transformation Kinetics and Mechanical Properties of Titanium-Aluminum-Chromium Alloys—By H. D. Kessler, Supervisor, Nonferrous Metals Research, and M. Hansen, Chairman, Metals Research, Armour Research Foundation, Chicago.

Isothermal Transformation of Titanium-Manganese Alloys—By P. D. Frost, Assistant Supervisor, W. M. Parris and L. L. Hirsch, Research Engineers, Nonferrous Metallurgy, J. R. Doig, Research Engineer and C. M. Schwartz, Supervisor, Physics Division, Battelle Memorial Institute, Columbus, Ohio.

Correlation Between Heat Treatment, Microstructure and Mechanical Properties of Titanium-Molybdenum Alloys—By D. J. DeLazaro, Assistant Metallurgist, and W. Bostoker, Senior Metallurgist, Metals Research Department, Armour Research Foundation, Chicago.

Program of ASM Technical Papers—Continued

Tuesday, October 20—9:30 A.M. Mechanical

Transverse Mechanical Properties of Slack-Quenched and Tempered Wrought Steel—By John Vajda and Paul E. Busby, Carnegie Institute of Technology, Pittsburgh.

A Time-Temperature Relationship for Recrystallization and Grain Growth—By F. R. Larson and J. Salmas, Physical Metallurgists, Watertown Arsenal Laboratory, Watertown, Mass.

Effect of Non-Martensite Decomposition Products on the Properties of Quenched and Tempered Steels—By E. F. Bailey, Metallurgist, Naval Research Laboratory, Washington, D. C.

The Effect of Inclusions on the Fatigue Strength of SAE-4340 Steels—By J. T. Ransom, Research Project Engineer, E. I. duPont deNemours & Co., Wilmington, Del.

Tuesday, October 20—9:30 A.M. Nonferrous

The System Zirconium-Aluminum—By D. J. McPherson, Supervisor, Physical Met. Res., and M. Hansen, Chairman, Metals Res. Dept., Armour Research Foundation, Chicago.

Observations on the Behavior of Hydrogen in Zirconium—By C. M. Schwartz and M. W. Mallett, Battelle Memorial Institute, Columbus, Ohio.

Recrystallization Applied to Control of the Mechanical Properties of Molybdenum—By J. H. Bechtold, Westinghouse Electric Corp., E. Pittsburgh, Pa.

Tuesday, October 20—2:00 P.M. Physical Metallurgy

Supercooling and Dendritic Freezing in Alloys—By W. C. Winegard and B. Chalmers, University of Toronto, Toronto, Canada.

Another Look at Quenchants, Cooling Rates and Hardenability—By D. J. Carney, United States Steel Corp., South Works, Chicago.

The Effect of Pearlite Spacing on Transition Temperature of Steel at Four Carbon Levels—By J. A. Rinebolt, Metallurgist, Naval Research Laboratory, Washington, D. C.

Elevation of Critical Temperatures in Steel by High Heating Rates—By W. J. Feuerstein, Metallurgist, and W. K. Smith, Head, Metallurgy Section of Materials Evaluation Branch, U. S. Naval Ordnance Test Station, China Lake, Calif.

Wednesday, October 21—9:00 A.M. ASM Annual Meeting

Campbell Memorial Lecture—By Donald S. Clark, California Institute of Technology.

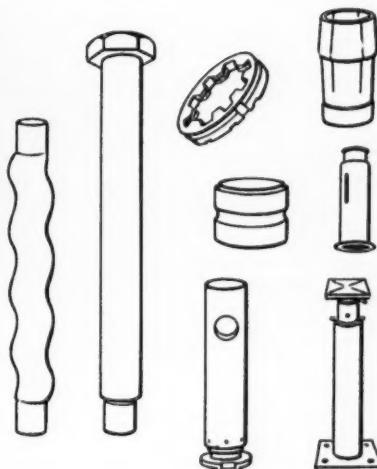
Wednesday, October 21—2:00 P.M. Boron

A Hypothesis for the Boron Hardenability Mechanism—By J. W. Spretnak and Rudolph Speiser, Associate Professors, Department of Metallurgy, Ohio State University, Columbus, Ohio.

The Effect of Boron on Notch Toughness and Temper Embrittlement—By A. E. Powers and R. G. Carlson, Turbine Division, General Electric Co., Schenectady, N. Y.

A Study of the Fe-Fe₃B System—By C. C. McBridge, E. I. duPont Co., Savannah River Plant, Augusta, Ga., and J. W. Spretnak and Rudolph Speiser, Associate Professors, Department of Metallurgy, Ohio State University, Columbus, Ohio.

The Carbonitriding of Boron Steels—By G. W. Powell, M. B. Bever and C. F. Floe, Massachusetts Institute of Technology, Cambridge, Mass.



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Program of ASM Technical Papers—Continued

Thursday, October 22—9:30 A.M.

Tempering

The Effect of Silicon on the Kinetics of Tempering—By W. S. Owen, University of Liverpool, Liverpool, England.

Microstructure Changes on Tempering Iron-Carbon Alloys—By B. S. Lement, B. L. Averbach and M. Cohen, Massachusetts Institute of Technology, Department of Metallurgy, Cambridge, Mass.

Effect of Chemical Composition on Susceptibility of Steels to Temper Brittleness—By Ralph Hultgren, Professor of Metallurgy and John Chuan Chang, University of California, Berkeley, Calif.

The Embrittlement of Alloy Steel at High Strength Levels—By L. J. Klingler, W. J. Barnett, R. P. Frohberg and A. R. Troiano, Department of Metallurgical Engineering, Case Institute of Technology, Cleveland.

Thursday, October 22—9:30 A.M.

Constitution

Equilibrium Structures in Fe-Cr-Mo Alloys—By J. G. McMullin, S. F. Reiter and D. G. Ebeling, Research Laboratory, General Electric Co., Schenectady, N. Y.

A Survey of Vanadium Binary Systems—By A. Yamamoto, Associate Metallurgist, Armour Research Foundation, Chicago.

Gamma Loop Studies in the Iron-Vanadium and the Iron-Vanadium-Titanium Systems—By W. R. Lucas, Graduate Student, and W. P. Fishel, Professor of Metallurgy, Vanderbilt University, Nashville, Tenn.

Thursday, October 22—2:00 P.M.

Stainless and High Speed Steel

High Temperature Transformations in Ferritic Stainless Steels Containing 17 to 25% Chromium—By A. E. Nehrenberg, Supervisor, Research Lab., and Peter Lillys, Research Metallurgist, Crucible Steel Company of America, Harrison, N. J.

Intergranular Corrosion of Ferritic Stainless Steels—By R. A. Lula, A. J. Lena and G. C. Kiefer, Allegheny Ludlum Steel Corp., Brackenridge, Pa.

Grain Growth in High Speed Steel—By Eric Kula and Morris Cohen, Department of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Discontinuous Grain Growth in High Speed Steel—By A. H. Grobe, Research Metallurgist, G. A. Roberts, Chief Metallurgist, and D. S. Chambers, Vanadium-Alloys Steel Co., Latrobe, Pa.

Friday, October 23—9:30 A.M.

Mechanical

Strain Aging Behavior of Rheotropically Embrittled Steel—By E. J. Ripling, Assistant Professor, Case Institute of Technology, Department of Metallurgy, Cleveland, Ohio.

Flow and Fracture of Single Crystals of High Purity Ferrite—By R. P. Steijn, Assistant Professor, Rice Institute, Houston, Texas, and R. M. Brick, Professor of Metallurgy, University of Pennsylvania, Philadelphia.

Notched Bar Tensile Properties of Various Materials and Their Relation to the Unnotch Flow Curve and Notch Sharpness—By Harry Schwartzbart, Research Metallurgist, Armour Research Foundation, Chicago, and W. F. Brown, Jr., Research Metallurgist, National Advisory Committee for Aeronautics, Cleveland.

Effect of Some Solid Solution Alloying Elements on the Creep Parameters of Nickel—By Thomas Hazlett, Research Engineer, and Earl R. Parker, Professor of Metallurgy, University of California, Berkeley, Calif.



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Tool No.	D	E	F	G	H	Boring Range
118	1 1/2"		5/8"	12 1/4"	14 1/4"	2" To 2 1/2" Dia.
116	2 1/4"	"D"	5/8"	14 1/2"	17"	2 1/4" To 3 1/4" Dia.
114	2 1/4"	Plus	5/8"	16"	19"	3 1/8" To 4 1/8" Dia.
111	3 1/2"	1 64"	5/8"	8 1/2"	12"	4 1/8" To 5 1/8" Dia.
107	4 1/2"		1"	7"	12 1/2"	5 1/8" To 7" Dia.

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ASM Educational Lectures

All Sessions in Ballroom, Public Auditorium

Monday, October 19—4:30 P.M.

Surface Protection Against Wear

Technique Selection—By Howard S. Avery, Research Metallurgist, American Brake Shoe Co., Mahwah, N. J.

Electroplates and Anodizing—By J. M. Hosdowich, United Chromium, Inc.

Case Hardening, Diffusion Coatings, and Selective Heat Treatment—By Michael B. Bever, Dept. of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Metal Spraying—By Howard Vanderpool, Sales Engineering Manager, Metallizing Engineering Co., Inc.

Monday, October 19—8:00 P.M.

Hard Facing and Abrasion Resistant Alloys—By Howard S. Avery, Research Metallurgist, American Brake Shoe Co., Mahwah, N. J.

Practical Examples of Surface Protection—By Theodore Gaynor, Superintendent of Inside Shops, Bethlehem Steel Company.

Summary and Discussion, by Howard S. Avery.

Tuesday, October 20—4:30 P.M.

Surface Protection Against Corrosion

Economic Factors of Atmospheric Corrosion Versus Protection—By Clarence C. Harvey, Ethyl Corp., Baton Rouge, La.

Surface Preparation and Pretreatment of Metals Prior to Painting—By A. J. Liebman, Assistant Director, Research & Development Dept., Dravo Corp., Neville Island, Pittsburgh.

Organic Coatings for Normal Service—By Arnold J. Eickhoff, National Lead Co., Brooklyn, New York.

Organic Coatings for Severe Service—By Kenneth Tator, Kenneth Tator Associates, Coraopolis, Pa.

Tuesday, October 20—8:00 P.M.

Specifications for the Painting of Metals—By Joseph Bigos, Director of Research, Steel Structures Painting Council, Pittsburgh.

Cathodic Protection and Galvanizing—By H. A. Robinson, Chief, Chemical Section, Dow Chemical Co., Midland, Mich.

Metallizing—By H. S. Ingham, Metallizing Engineering Co., Inc., Long Island City, New York.

Electrodeposited Coatings—By Field Ogburn, Chemist, National Bureau of Standards, Washington, D. C.

Wednesday, October 21—4:30 P.M.

Fatigue

Basic Concepts of Fatigue Damage in Metals—By T. J. Dolan, Research Professor of Theoretical & Applied Mechanics, University of Illinois, Urbana, Ill.

Fatigue Under Resonant Vibration Conditions—By B. J. Lazan, Director of Engineering Experiment Station, University of Minnesota, Minneapolis.

Wednesday, October 21—8:00 P.M.

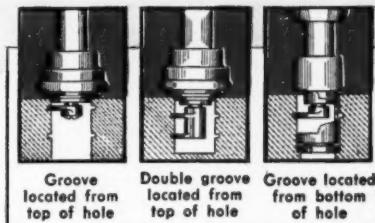
Fatigue Characteristics of Large Sections—By O. J. Horger, Chief Engineer, Railway Division, Timken Roller Bearing Co., Canton, Ohio.

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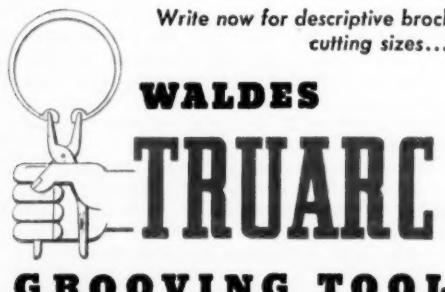


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1953 ASM Award Winners

Gold Medal—American Society for Metals



Dr. George Sachs

Dr. George Sachs, Director of Metallurgical Research, Institute of Industrial Research, Syracuse University, Syracuse, New York, is the 1953 recipient of the American Society for Metals' Gold Medal Award. The Gold Medal of the American Society for Metals was established in 1943 to recognize outstanding metallurgical knowledge and exceptional ability in the diagnosis and solution of diversified metallurgical problems. Dr. Sachs is one of the country's leading authorities on Diffraction Analysis and has contributed greatly to the advancement of methods covering flow, stress, deep drawing, and crystallography.

Dr. Sachs is a native of Russia, and was educated in Germany. He received his B. Sc. degree in Civil Engineering, and his D. Eng. degree in Mechanical Engineering, both from the Berlin Engineering School. In 1953 ASM Gold Medal winner was Professor-Lecturer on the Physics of Metals at Frankfort University in Germany. He was also associated with the Berlin Engineering School, the Kaiser Wilhelm Institute for Metals Research as well as Director of Metals Research at Frankfort's Metallgesellschaft, and Vice-President of Development and Research at Duerener Metallwerke. Dr. Sachs has had many important assignments as special consultant and has been Director of Metallurgical Research at Syracuse University since 1952.

Medal for the Advancement of Research—American Society for Metals



H. G. Batcheller

In 1953, the ASM Medal for the Advancement of Research will be presented to Hiland Garfield Batcheller, Chairman of the Board of Allegheny-Ludlum Steel Corporation. Founded in 1943 by the American Society for Metals, the medal is based upon these qualifications: "The candidate shall be an executive in an industrial organization, the principal activity of which is the production or fabrication of metals. He shall be one who, over a period of years, has consistently sponsored metallurgical research or development, and by his foresight and influence in making available financial support, has helped substantially to advance the Arts and Sciences related to metals."

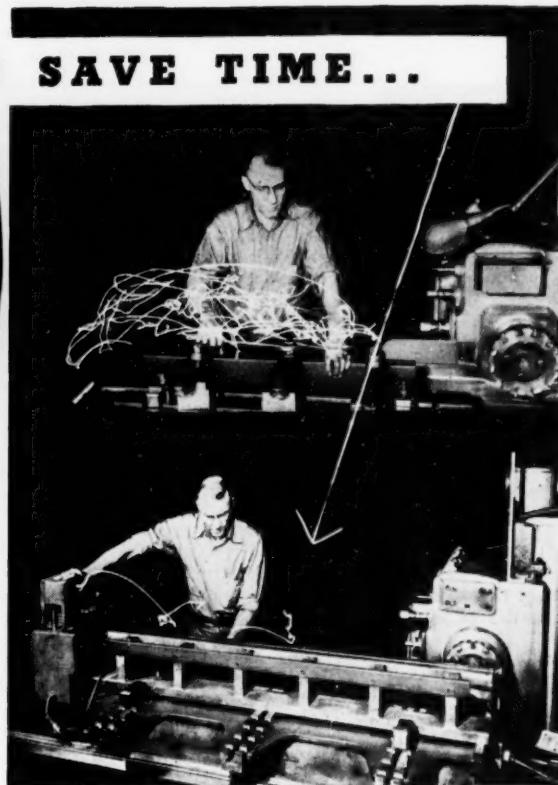
Dr. Batcheller is a native of Brooklyn, New York. He was educated in Glens Falls, New York, and Wesleyan University, Middletown, Connecticut. He received the degree of Ph.D. in 1907 from Wesleyan, and from Rensselaer Polytechnic Institute he was awarded the degree, D. Eng. He also received the degree of D. Sc. from Jefferson Medical College, Philadelphia, in 1951.

Dr. Batcheller began his industrial career with the Carnegie Steel Company shortly after graduation from Wesleyan University. In 1916, he resigned from Carnegie Steel to become Assistant to the President of Ludlum Steel Company. He was elected Vice-President of Ludlum Steel in 1918. In 1925, he was made Executive Vice-President and in 1930, he was elected President. In 1938, when Ludlum Steel Company was merged with Allegheny Steel Company, Dr. Batcheller became President of the combined organization. In December, 1949, he was elected Chairman of the Board of Allegheny-Ludlum, a position which he still occupies.

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Albert Sauveur Achievement Award—American Society for Metals



William T. Ennor

William T. Ennor, Assistant Director of Research, Aluminum Research Laboratories, Aluminum Company of America, is the 1953 winner of the Albert Sauveur Achievement Award presented by the American Society for Metals. The award was established by the American Society for Metals in 1934 in honor of Dr. Albert Sauveur, late Harvard University Professor and widely known as the "Dean of American Metallurgists."

The 1953 Sauveur Medalist is one of the country's outstanding authorities on nonferrous metals, having developed for a large scale production use the D. C. (directly chilled) ingot. Mr. Ennor has also made practical contributions in the fields of rolled forging stock and structural shapes, as well as improvements in conductor wire, Alclad wire, and aluminum screen cloth. The Sauveur Medalist for 1953 holds many patents on the processing of aluminum and its alloys.

Mr. Ennor is a graduate of the University of Wisconsin where he was an instructor immediately after graduation. He joined the Aluminum Company of America in 1924.

Special Libraries Association

(Metals Division and Metals Section of Science-Technology Division)
Wednesday, October 21

Field Trip to Battelle Memorial Institute, Columbus, Ohio, to inspect library and research facilities of the Institute.

Thursday, October 22—9:30 A.M.

Metal Fabrication. Methods and Literature. (Public Auditorium, Cleveland)
Modern Methods for Joining Metals—By Dr. P. T. Stroup, Chief of the Process Metallurgy Division, Aluminum Research Laboratories.

Abstracting and Indexing Sources for Literature on Metals and Metal Fabrication—By Ellis Mount, Research Associate, Research Information Service, John Crerar Library.
Services Available From Large Libraries—By Prof. Esther M. Schlundt, Head, Readers Division, Purdue University.

Thursday, October 22—2:00 P.M.

Fundamentals of the Newer Metals. (Public Auditorium, Cleveland)
Materials for Use at Elevated Temperatures—By Dr. W. J. Harris, Jr., Executive Secretary, Minerals and Metals Advisory Board, National Academy of Sciences.

Metallic Materials for Nuclear Reactors—By Frank G. Foote, Director, Metallurgical Division, Argonne National Laboratory.

6:30 P.M.—Dinner with Cleveland Chapter, S. L. A., Hotel Allerton, Mather Room.

8:15 P.M.—Methods for Improvement of Reading Speed and Efficiency, as Developed at Case Institute of Technology. Mr. Harold Johnson, Director, Reading Improvement Laboratory, Case Institute of Technology.

Friday, October 23—10:00 A.M.

Technical Session. (Case Institute of Technology, Thomlinson Hall)
Operations Research as a Metallurgical Tool—By C. West Churchman, Case Institute of Technology.

Techniques in Report Writing—By Robert L. Shurter, Professor and Director, Humanistic Social Division, Case Institute of Technology.

12:30 P.M.—Luncheon, Crosby's Restaurant, 10505 Carnegie Ave.

2:00 P.M.—Visit to Warner & Swasey Co., 5701 Carnegie Ave. Taking The Mystery Out of Machine Tools (an informal discussion)—By Warner Seely, Vice-President of Public Relations. Followed by inspection trip of library and plant.



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Program of AWS Technical Papers

Technical Sessions at Hotel Cleveland

Monday Morning, October 19

Award of Prizes
Adams Lecture

Chairman—F. L. Plummer, President, AWS

Co-Chairman—H. C. Boardman, Chairman, National Program Committee

Aspects of Welding Research in British Merchant Shipbuilding—By R. B. Shepheard, The Shipbuilding conference.

Monday Afternoon, October 19

Two Simultaneous Sessions—Gouging and Cutting

Chairman—Richard L. Deily, Air Reduction Sales Co.

Co-Chairman—R. S. Babcock, Linde Air Products Co.

The Arcair Process—By Myron D. Stepath, Arcair Co.

Shielded Metal-Arc Cutting and Grooving—By Helmut Thielsch and J. Quaas, Eutectic Welding Alloys Corp.

Advanced Automatic Flame Cutting for Machinery Weldments—By Howard B. Cary, Marion Power Shovel Co.

Resistance Welding

Chairman—R. E. Powell, Western Electric Co.

Co-Chairman—John Diebold, Diebold Engineering Sales Co.

Radiography of Spot Welds—By Robert C. McMaster, Battelle Memorial Institute.

Resistance Welding in Jet Engine Manufacturing—By Frank J. Wallace, Pratt and Whitney Aircraft Div. of UAC.

A Study of the Cooling Rates in Flash Welds in Steel—By Ernest F. Nippes, Warren F. Savage and Gordon Grotke, Rensselaer Polytechnic Institute.

Some Applications of High-Speed Motion Picture Photography to Resistance Welding—By I. S. Goodman, Westinghouse Electric Corp.

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Program of AWS Technical Papers—Continued

Monday Evening, October 19
Ball Room

President's Reception—National Officers' Dinner

Tuesday Morning, October 20

Three Simultaneous Sessions—Stainless Steel

Chairman—F. W. Davis, U. S. Atomic Energy Commission
Co-Chairman—V. N. Krivorbok, The International Nickel Co.

Effect of Various Heat Treatments on Modified 347 Weld Deposits—By R. D. Thomas, Jr., and Lorin K. Poole, Arcos Corp.

Silver Brazing Alloys for Corrosion-Resistant Joints in Stainless Steels—By George H. Sistare, Handy & Harman, L. H. Grenell, General Motors, and John J. Halbig, Armco Steel Corp.

Submerged Arc Welding of Chromium Bearing Steels—By Clarence E. Jackson and Arthur E. Shrubsall, Union Carbide & Carbon Laboratories.

Titanium

Chairman—F. R. Hensel, P. R. Mallory & Co.

Co-Chairman—G. Grable, Battelle Memorial Institute

Tension, Shear and Impact Strengths of Spot-Welded Titanium Joints—By M. L. Begeman, E. H. Block, Jr., and Frank W. McBee, Jr., U. of Texas.

Fusion Welding Commercially Pure Titanium—By Francis H. Stevenson, Aerojet General Corp.
Alloy Filler Metals in Commercially Pure Titanium—By Carl E. Hartbower, Watertown Arsenal Laboratory.

Structural

Chairman—Bruce G. Johnston, University of Michigan

Co-Chairman—Ross Yarrow, Consolidated Iron & Steel Co.

Residual Stress and Inelastic Bending of WF Columns—By Robert L. Ketter, Lynn S. Beedle, Lehigh University, and E. L. Kaminsky, David Taylor Model Basin.

Weldability of Structural Steel Discussed from the Viewpoint of Federal Agencies—By E. I. Erickson, Chief, Bridge Branch, Bureau of Public Roads.

Development of Welded Bridge Construction—By N. W. Morgan, Principal Highway Bridge Engineer, Bureau of Public Roads.

Recent Applications of Welded Design to Industrial Building Framings.

Tuesday Afternoon, October 20

Two Simultaneous Sessions—Aluminum and Aircraft

Chairman—R. S. Green, Ohio State University

Co-Chairman—Charles Bruno, Reynolds Metals Co.

Soldering of Aluminum—By James D. Dowd, Aluminum Company of America.

Fatigue Strength of Welded Butt Joints in $\frac{3}{8}$ -in. Thick Aluminum Alloy Plates—By E. C. Hartmann, Marshall Holt and I. D. Eaton, Aluminum Company of America.

Some Considerations on Weldability of Aluminum Alloys—By J. Kozierski, Piasecki Helicopter Corp.

Weldability

Chairman—R. E. Somers, Bethlehem Steel Co.

Co-Chairman—J. Robert Henry, Cleveland Diesel Div., General Motors Corp.

Cracking in High-Temperature Alloys as Related to Microstructure—By W. R. Apblett and W. S. Pellini, Naval Research Laboratory.

Ductility Transition Characteristics of Weld Metal—By Earl Eschbacher and W. S. Pellini, Naval Research Laboratory.

Further Studies on Weld-Metal Microcracking in Mild Steel—By A. E. Flanigan, University of California.

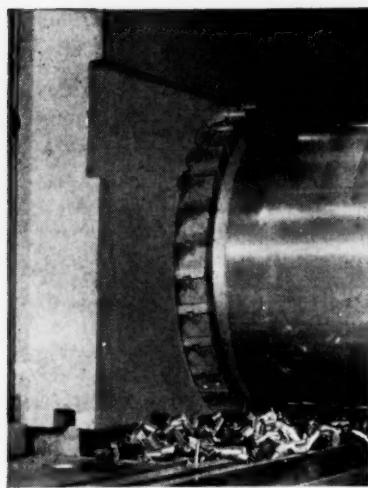
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Milling Tough, Hard Steel

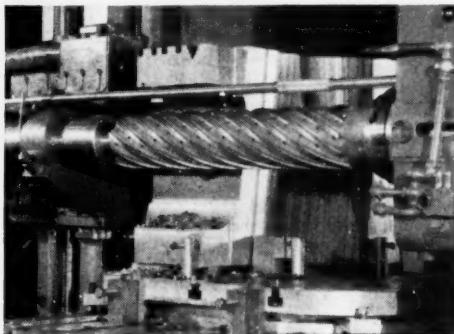
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WRITE FOR INGERSOLL CUTTER CATALOG NO. 60A

THE INGERSOLL MILLING MACHINE CO., ROCKFORD, ILLINOIS
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Program of AWS Technical Papers—Continued

Wednesday Morning, October 21

Two Simultaneous Sessions—Weldability

Chairman—L. C. Bibber, United States Steel Co.

Co-Chairman—G. E. Claussen, Union Carbide & Carbon Research Laboratories, Inc.

Army First Pass Groove Weld Crack Susceptibility Test—By Z. J. Fabrykowski, S. Goodman and B. A. Schevo, Detroit Arsenal.

Low-Temperature Bend-Test Properties of Bead-on-Plate Welds—By L. S. Harris, R. B. Matthiesen and N. M. Newmark, University of Illinois.

Fatigue Properties of Weld Metal—By L. S. Harris, R. B. Matthiesen and N. M. Newmark, University of Illinois.

Titanium

Chairman—Col. B. S. Mesick, Ordnance Corps, Watertown Arsenal

Co-Chairman—W. L. Warner, Watertown Arsenal

A Study of the Weld Heat-Affected Zones in Titanium Alloys—By Ernest F. Nippes, John M. Gerken and Bernard W. Schaaf, Rensselaer Polytechnic Institute.

Welding Characteristics of Titanium and Titanium Alloys—By Mario L. Ochieano, Lockheed Aircraft Corp.

Study of the Effects of Alloying Elements on the Weldability of Titanium Sheet—By Dr. Max Hansen, Armour Research Foundation.

Controls and Inspection

Chairman—Gilbert S. Schaller, University of Washington

Co-Chairman—R. J. Kriz, The James B. Herron Co.

Inspection Techniques for Quality Welding Production—By Lew Gilbert, Industry and Welding, and William B. Bunn, The M. W. Kellogg Co.

Nondestructive Testing as an Aid to the Increased Use of Welding for Steel Structures—By Lloyd J. Oye, Magnaflux Corp.

Tolerances on Fillet Welds—By John Mikulak, and Merle B. Dillman, Worthington Corp.

Wednesday Afternoon, October 21

Three Simultaneous Sessions—Pipe

Chairman—A. J. Erlacher, United Engineers & Constructors, Inc.

Co-Chairman—N. C. Jessen, Babcock & Wilcox

Further Studies of the Arc Welding of Low-Chromium Molybdenum Steel Pipe—By J. Bland, Standard Oil Co. (Ind.)

Superheaters for 1100° to 1500° F. Test Installation—By Bela Ronay and W. E. Clautice, U. S. Naval Engineering Experiment Station.

Carbide Segregation and Decarburization at Welded Joints—By I. A. Rohrig, Detroit Edison Co., and H. S. Blumberg, M. W. Kellogg Co.

Research

Chairman—G. E. Doan, Kippers Co., Inc.

Co-Chairman—Frank Flocke, The Thornton Co.

Welding Metallurgy of Nodular Cast Iron—By Edward E. Hucke and Prof. H. Udin, Massachusetts Institute of Technology.

The Effect of Low-Temperature Stress Relieving on Stress-Corrosion Cracking of Mild Steel—By C. R. McKinsey, Union Carbide and Carbon Research Laboratories, Inc.

Transformation of Cr-Mo Steels During Welding—By W. R. Apblett, Jr., R. P. Dunphy and W. S. Pellini, Naval Research Lab.

Multiple Contact Resistance—By W. B. Kouwenhoven and Donald R. Hagner, The Johns Hopkins University.

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Program of AWS Technical Papers—Continued

Education

Chairman—Dean A. Potter, Purdue University

Co-Chairman—Prof. M. L. Begeman, University of Texas

Teaching Engineering Fundamentals—By Dean S. C. Hollister, Cornell University.
Discussion: Dean W. B. Kouwenhoven, The Johns Hopkins University; Prof. R. S. Green, Ohio State University.

Teaching Welding Design—By Dr. J. P. Vidosic.

Wednesday Evening, October 21

Section Officers' Dinner

WRC University Dinner and Conference

Thursday Morning, October 22

Three Simultaneous Sessions—*Pressure Vessels and Research*

Chairman—T. N. Armstrong, The International Nickel Co., Inc.

Co-Chairman—L. J. Larson, Allis-Chalmers Manufacturing Co.

Plastic Fatigue Strength of Pressure Vessel Steels—By Robert D. Stout, John H. Gross and D. E. Gucer, Lehigh University.

A Qualitative Study of Residual Stresses in Welds by Photo-elasticity—By Dr. Melvin Mark, Raytheon Manufacturing Co.

Effect of Nitrogen and Carbon Dioxide Atmospheres on Arc Welding—By Profs. Sowa, Truckenmiller and Wagner, University of Michigan.

Biaxial Fatigue Properties of Pressure-Vessel Steels—By T. J. Dolan and C. E. Bowman, University of Illinois.

Inert Arc Welding

Chairman—C. I. MacGuffie, General Electric Co.

Co-Chairman—H. E. Rockefeller, Linde Air Products Co.

Inert-Gas-Shielded Metal-Arc Welding of Low Carbon Steels—By Geo. C. Christopher and R. C. Becker, International Harvester Co.

Characteristics of Consumable-Electrode Inert Arcs—By R. W. Tuthill, General Electric Co.

Effect of Power Supply Characteristics on Sigma Welding—By W. H. Helmbrecht, and R. L. Hackman, Linde Air Products Co.

Weld Properties of a Carbon-Steel Electrode for Use with Inert Gas Shields—By Harry C. Cook and Gilbert R. Rothschild, Air Reduction Research Labs.

Automatic Arc

Chairman—C. C. Peck, Cecil C. Peck Co.

Co-Chairman—L. S. McPhee, Whiting Corp.

New Developments in Fluxes for Automatic Welding and Hard Surfacing—By L. K. Stringham, Lincoln Electric Co.

Multiple Electrode Welding by the Unionmelt Process—By D. E. Knight, Linde Air Products Co.

Multiple-Arc Submerged Arc Welding—By Theodore Ashton, Lincoln Electric Co.

Friday Morning, October 23

Three Simultaneous Sessions—*Applications*

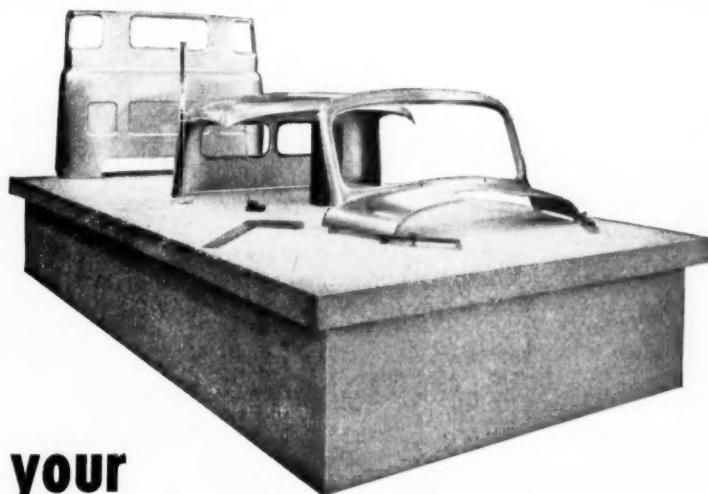
Chairman—C. B. Herrick, C. B. Herrick Co.

New Welding Shop Facilities, Methods and Equipment at the Whiting Refinery—By Ray M. Kolb and R. C. Wheeler, Standard Oil Co. (Ind.)

Silver and Gold for Brazing Electronic Components—By A. W. Swift and R. J. Metzler, Handy & Harman.

New Results in Tool and Die Welding—By Robert H. Groman, Eutectic Welding Alloys Corp.

Austenitic Manganese Steel Welding Electrodes—By Howard S. Avery and Henry J. Chapin, American Brake Shoe Co.



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Program of AWS Technical Papers—Continued

Inert Arc Welding

Chairman—R. M. Wilson, International Nickel Co.

Co-Chairman—A. R. Lytle, Electro Metallurgical Co.

A New Method to Prevent Rectification of Current and High-Frequency Interference in Inert-Gas

Arc Welding—By John Murray, Lincoln Electric Co.

New Developments in Sigma Welding of Carbon Steel—By T. McElrath, Jr., and R. T. Telford,

Linde Air Products Co.

Porosity in the Welding of Carbon Steel—By Glenn W. Oyler and Robert D. Stout, Lehigh

University.

Field-Erected Structures

Chairman—E. Mac Cutcheon, Bureau of Ships, U. S. Navy

Co-Chairman—L. C. McNutt, United Engineers & Constructors, Inc.

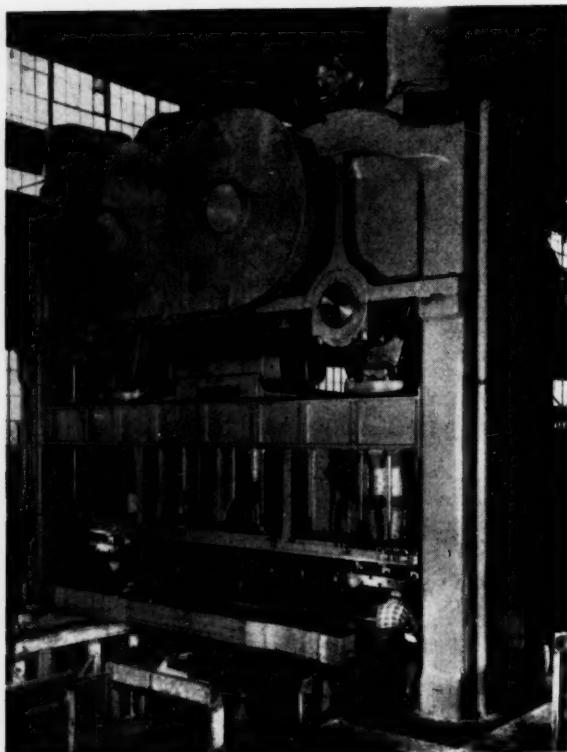
Scale Effects in Notch Brittleness—By Yoshio Akita, Transportation Technical Research Institute.

Effect of Subcritical Heat Treatment on the Transition Temperature of a Ship Plate Steel—By

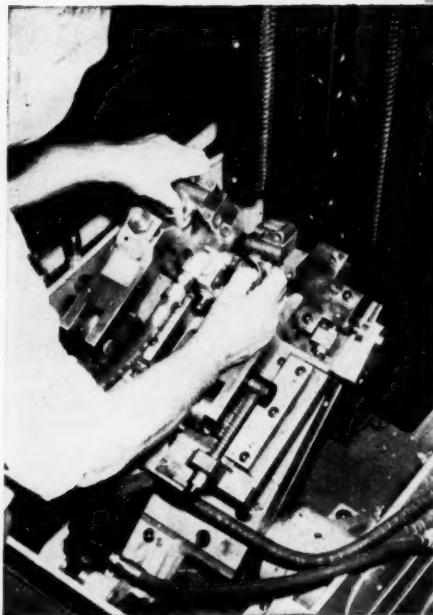
E. B. Evans and L. J. Klingler, Case Institute of Technology.

Welded Mexican Bridge—By Thomas C. Kavanagh, New York University.

Side Rail Press with Pressure Capacity of 4,000 Tons



A MECHANICAL press of 4,000 tons pressure capacity—reported to be the largest of its type ever built—is shown here being used for forming truck chassis side rails 22 feet long from $\frac{1}{4}$ -inch steel at Midland Steel Products Co., Cleveland, Ohio. Built by Baldwin-Lima-Hamilton Corp., Hamilton, Ohio, the press has an overall height of 44 feet, with the topmost point 30 feet above the floor. The clearance space between uprights and gibs is 320 inches. The press weighs 1,800,000 lb. The slide has a stroke of 22 inches and adjustment of 12 inches. The shut height of the bed is 40 inches. A 150 h.p. motor is used for the drive and a 25 h.p. motor for slide adjustment. An outstanding feature of the press is its ability to produce the heaviest side rails with minimum camber or "bow."

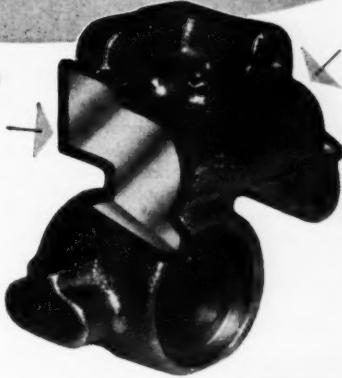


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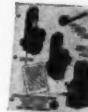
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Program of AIME Institute of Metals Division

Technical Sessions at the Allerton Hotel

Monday, October 19

9:00 A.M.-12 M., Ballroom

Plastic Deformation

Plasticity of Columbium Single Crystals—By R. Maddin and N. K. Chen, Johns Hopkins University. *Journal of Metals*, September 1953.

Plastic Deformation of Iron Between 300° and 77.2° K—By Donald F. Gibbons, Royal Military College of Canada. *Journal of Metals*, September 1953.

Deformation of Ferrite Single Crystals—By F. L. Vogel, Jr., and R. M. Brick, University of Pennsylvania. *Journal of Metals*, May 1953.

Plastic Stress Strain Relations for 14S-T6 Subjected to Combined Tension and Torsion—By Joseph Marin and A. B. Wiseman, Pennsylvania State College. *Journal of Metals*, September 1953.

9:00 A.M.-12 M., Mather Room

Metallography

Revealing the Subgrain Structure of Aluminum—By M. S. Hunter and D. L. Robinson, Aluminum Company of America. *Journal of Metals*, May 1953.

Grain Boundary Attack on Aluminum in Hydrochloric Acid and Sodium Hydroxide—By E. C. W. Perryman, Aluminum Laboratories Ltd. *Journal of Metals*, July 1953.

Microscopical Examination of Tin Bronzes in the Alpha Range—By E. C. W. Perryman, Aluminum Laboratories Ltd. *Journal of Metals*, July 1953.

Identification of the Precipitate Accompanying 885° F Embrittlement in Chromium Steels—By R. M. Fisher, E. J. Dulis and K. G. Carroll, United States Steel Corp. *Journal of Metals*, May 1953.

Measurement of Particle Sizes in Opaque Bodies—By R. L. Fullman, General Electric Co. *Journal of Metals*, March 1953.

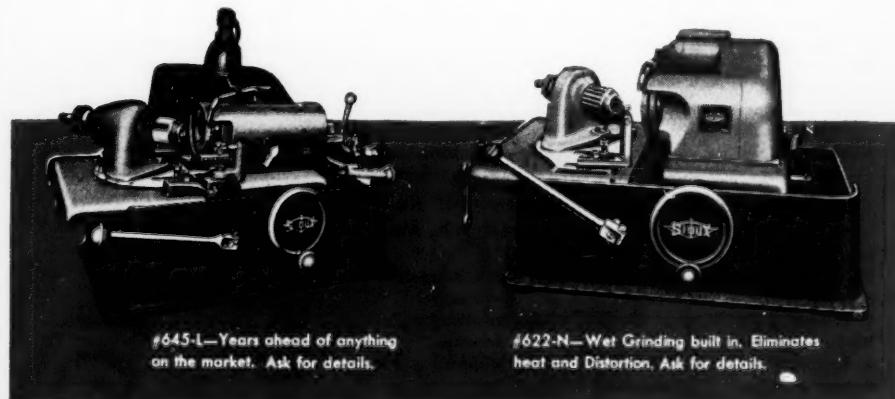
Measurement of Approximately Cylindrical Particles of Opaque Samples—By R. L. Fullman, General Electric Co. *Journal of Metals*, September 1953.

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Program of AIME Institute of Metals Division Papers—Continued

2:00-5:00 P.M., Ballroom

Plastic Deformation

Plastic Deformation of Single Crystals of Copper—By J. J. Becker, General Electric Research Lab., and J. N. Hobstetter, Bell Telephone Labs. *Journal of Metals*, September 1953.

Orientation Relationships in the Recrystallization of Deformed Copper Single Crystals—By J. J. Becker, General Electric Research Lab., and J. N. Hobstetter, Bell Telephone Labs. *Journal of Metals*, September 1953.

Plastic Deformation of Rectangular Zinc Monocrystals—By John J. Gilman, Columbia University. *Journal of Metals*, September 1953.

Variation of Plastic Properties with Annealing Procedure in Zinc Single Crystals—By Choh Hsien Li, Jack Washburn and Earl R. Parker, University of California. *Journal of Metals*, September 1953.

Recovery in Single Crystals of Zinc—By R. Drouard, Paris; Jack Washburn and Earl R. Parker, University of California, *Journal of Metals*, September 1953.

Some Observations on the Work Hardening of Metals—By E. H. Edwards, Jack Washburn and Earl R. Parker, University of California. *Journal of Metals*.

2:00-5:00 P.M., Mather Room

Thermodynamics

Some Applications of the Thermodynamic Theory of Irreversible Processes to Physical Metallurgy—By E. S. Machlin, Columbia University.

Vapor Pressure of Silver Over Silver-Gold Solutions—By C. L. McCabe, H. M. Schadel, Jr., and C. E. Birchenall, Carnegie Institute of Technology.

Vapor Pressure of Silver—By C. L. McCabe and C. E. Birchenall, Carnegie Institute of Technology.

High Pressure Oxidation Rate of Metals—By William McKewan, New Jersey Zinc Co. of Pa., and W. Martin Fassell, Jr., University of Utah.

Self-Diffusion of Iron in Iron Oxides and The Wagner Theory of Oxidation—By L. Himmel and R. F. Mehl, Carnegie Institute of Technology, and C. E. Birchenall, Princeton University.

Decay of Lattice Defects Frozen into an Alloy by Quenching—By A. E. Roswell and A. S. Nowick, Yale University.

2:00-5:00 P.M., Chester Room

Constitutional Diagrams

Ternary System Ti-Ta-C—By John G. McMullin, General Electric Research Labs., and John T. Norton, Massachusetts Institute of Technology.

Titanium-Rich Corners of the Ti-C-N, Ti-C-O and Ti-N-O Phase Diagrams—By L. Stone and H. Margolin, New York University.

System Titanium-Chromium-Iron—By R. J. Van Thyne, H. D. Kessler and M. Hansen, Armour Research Foundation of Illinois Institute of Technology.

Molybdenum Boron System—By P. W. Gilles, and B. D. Pollock, University of Kansas.

Vanadium-Uranium Constitutional Diagram—By H. A. Saller and F. A. Rough, Battelle Memorial Institute.

Order-Disorder Transformation in Cu-Au Alloys Near the Composition CuAu—By J. B. Newkirk, General Electric Co.

Analysis of Molten Zone Refining—By N. W. Lord, Raytheon Manufacturing Co.

7:45 P.M., Ballroom

Panel Discussion of Recrystallization

B. L. Averbach, Moderator

Paul A. Beck—"Do Metals Recrystallize?"

Cyril Stanley Smith—"Interfacial Energy and Recrystallization"

B. L. Averbach—"Recovery"

E. E. Stansbury—"Stored Energy and Recrystallization"

D. Turnbull—"Significance of Activation Energies"

J. E. Burke—"Recrystallization as a Nucleation and Growth Process"

Robert Maddin—"Textures and Recrystallization"

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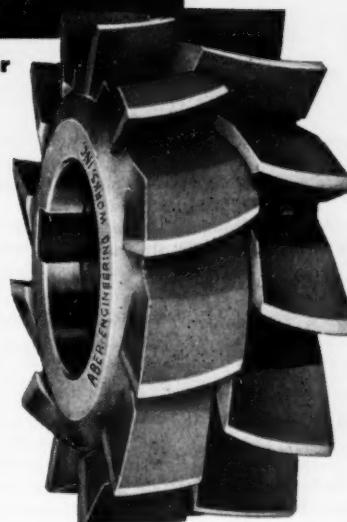
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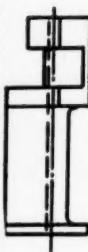
MACHINE: U. S. Multimill

TOOL: Aber "Curved Tooth" right and left hand shear side milling cutter. 3" x $\frac{3}{8}$ " x $\frac{1}{8}$ "

MATERIAL: Bronze Turbine Blades.

COMPARATIVE PERFORMANCE

S.F.M. Speed:	ABER CUTTER	STANDARD CUTTERS
Feed per Rev.:	400sfm	400sfm
Depth of Cut:	$\frac{1}{16}$ " per min.	$\frac{1}{12}$ " per min.
Pieces per Grind:	20,000 and still going strong	3,000 to 4,000 maximum



You too can profit by applying Aber "Curved Tooth" milling cutters for increased production and reduced rejections due to off-tolerance, unsatisfactory finish milling operations. Remember every Aber Tool has the exclusive, patented "Curved Tooth" design providing chatterless, smooth cutting action.

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Program of AIME Institute of Metals Division Papers—Continued

Tuesday, October 20

9:00 A.M.-12 M., Chester Room Transformation

Silver-Cadmium Eutectoid—By G. R. Speich, Westinghouse Electric Corp., and D. J. Mack, University of Wisconsin.

Diffusionless Phase Change in the Indium Thallium System—By M. W. Burkart and T. A. Read, Columbia University.

On the Theory of the Formation of Martensite—By M. S. Wechsler, D. S. Lieberman and T. A. Read, Columbia University.

Rate of Propagation of Martensite—By R. F. Bunshah and R. F. Mehl, Carnegie Institute of Technology.

Rate of Formation of Isothermal Martensite in Fe-Ni-Mn Alloy—By R. E. Cech and J. H. Holloman, General Electric Co.

Calculation of Martensite Nucleus Energy Using The Reaction-Path Model—By J. C. Fisher and D. Turnbull, General Electric Co.

Martensite Nucleation in Substitutional Iron Alloys—By John C. Fisher, General Electric Co.

Stabilization of the Austenite-Martensite Reaction in a High Chromium Steel—By S. C. Das Gupta and B. S. Lement, Massachusetts Institute of Technology.

9:00 A.M.-12 M., Ballroom Symposium On Physical Metallurgy of Titanium and Its Alloys M. A. Hunter and H. A. Jackson, Chairmen

Hardening and Embrittlement of Beta Stabilized Titanium Alloys—By W. M. Parris, Mr. Young, A. J. Griest, Jr., and P. D. Frost, Battelle Memorial Institute.

Titanium Base Alloys for Elevated Temperatures—By Harold Kessler, Armour Foundation.

Development of Titanium Alloys—By Schuyler Heries, Titanium Metals Corp. of America.

Heat Treatment, Structure and Mechanical Properties of Titanium-Manganese Alloys—By F. C. Holden, H. R. Ogden and R. I. Jaffee, Battelle Memorial Institute.

Heat Treatment and Alloying of Titanium—By L. D. Jaffee, Watertown Arsenal Laboratory.

2:00-5:00 P.M., Mather Room Research In Progress

(Abstracts of papers to be presented at this session appear in the September issue of JOURNAL OF METALS)

Heat Treatment of Titanium Alloys Generalized in Terms of B' —By Leonard D. Jaffee, Watertown Arsenal.

Solid State Bonding of Aluminum and Nickel—By S. Storchheim, J. L. Zambrow, and H. H. Hausner, Sylvania Electric Products, Inc., atomic energy div.

Grain Boundary Creep—By F. N. Rhines, Carnegie Institute of Technology.

The Spread in Orientations Among Micronegions in Cast and Deformed Crystals—By W. C. Ellis, Bell Telephone Laboratories, Inc.

Growth Structures Formed During the Solidification of Metal Crystals—By C. Elbaum and B. Chalmers, Harvard University.

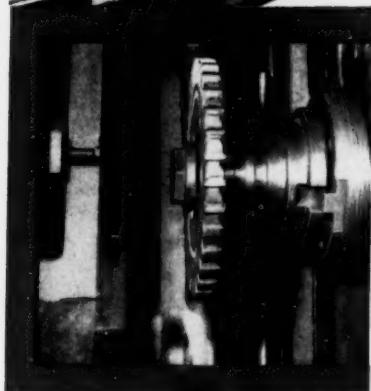
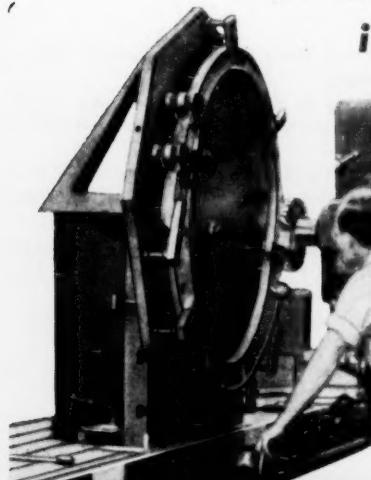
Curie Temperatures of Certain Ternary Sigma Alloys—By M. V. Nevitt and P. A. Beck, University of Illinois.

The Effect of Grain Size on Ultrasonic Transmissibility—By Nicholas Grossman, Sylvania Electric Products Inc.

Mechanism of Plastic Flow in Titanium at Low and High Temperatures—By F. D. Rosi and F. C. Perkins, Sylvania Electric Products Inc.

OK Carbide Cutters mill vital "Thunderjet" forgings - III

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Further reasons on why it pays to standardize on OK cutters are found in Catalog 13. Write for your copy.

THE OK TOOL COMPANY, INC., Milford, New Hampshire

OK
modern milling cutters
for
modern milling machines

Program of AIME Institute of Metals Division Papers—Continued

2:00-5:00 P.M., Chester Room Creep

Inhomogeneity in Creep Deformation of Coarse Grained High Purity Aluminum—By H. C. Chang and N. J. Grant, Massachusetts Institute of Technology.

Subgrain Formation in High Purity Aluminum During Creep at High Temperatures—By Andre M. Gervais, Societe Commentry-Fouchambault et Decazeville, John T. Norton and Nicholas J. Grant, Massachusetts Institute of Technology.

Metallographic Observations of the Deformation of High-Purity Magnesium in Creep at 500°F—By A. R. Chaudhuri, N. J. Grant and J. T. Norton, Massachusetts Institute of Technology.

Creep Behavior of Extruded Electrolytic Magnesium—By C. S. Roberts, Dow Chemical Co.

Further Progress in the Development of Mg-Zr Alloys to Give Good Creep and Fatigue Properties Between 500° and 650° F—By C. J. P. Ball, A. C. Jessup, P. A. Fisher, D. J. Whitehead and J. B. Wilson, Magnesium Elektron Ltd.

Properties of Sand Cast Magnesium-Thorium Zinc-Zirconium Alloys—By K. E. Nelson, Dow Chemical Co.

A Rationalization of Measured High Temperature Properties of Fe-Cr-Co-Ni Alloys—By J. D. Nisbet and W. R. Hibbard, Jr., General Electric Co.

Wednesday, October 21 2:00-5:00 P.M., Ballroom

Plastic Deformation of Titanium, Molybdenum and Zirconium

Deformation Mechanisms in Alpha Titanium—By E. A. Anderson, D. C. Jillson and S. R. Dunbar, New Jersey Zinc Co. of Pa.

Cold Rolled Texture of Titanium—By D. N. Williams, and D. S. Eppelsheimer, University of Missouri.

Effects of Solid Solution Alloying on the Cold-Rolled Texture of Titanium—By Carl J. McMarge, University of Kentucky, Sam E. Adair, Jr., Linde Air Products, and Joseph P. Hammond, University of Kentucky.

Textures of Rolled and Annealed Iodide Zirconium—By J. H. Keeler, W. R. Hibbard, Jr., and B. F. Decker, General Electric Co.

2:00-5:00 P.M., Chester Room Physical Metallurgy

Effects of Microstructure on the Performance of Alnico Permanent Magnets—By Dolph G. Ebeling, General Electric Co., and Arthur A. Burr, Rensselaer Polytechnic Institute.

Densification and Kinetics of Grain Growth During Sintering of Chromium Carbide—By H. J. Hamjian, Utica Drop Forge and Tool Corp., and W. G. Lidman, Sylvania Electric Products Inc.

Influence of Aluminum and Silicon Deoxidation on the Strain Aging of Low-Carbon Steels—By W. C. Leslie and R. L. Rickett, U. S. Steel Corp.

Age Softening of Beta Brass—By Harry Green, Horizons Inc., and Norman Brown, University of Pennsylvania.

Anelastic Behavior of Pure Gold Wire—By Donald R. Mash and Lewis D. Hall, Stanford University.

Some Properties of Columbium Containing Nitrogen—By Choh-Yi Ang and Charles Wert, University of Illinois.

Electrical Resistivity of Liquid Metals and of Dilute Liquid Metallic Solutions—By E. Scala, Chase Brass & Copper Co., and W. D. Robertson, Yale University.



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Program of SNT Technical Papers

Technical Sessions at Hollenden Hotel

Monday, October 19—200 P.M.

Radiography

Chairman—Royal G. Tobey, Eastman Kodak Co.

Co-Chairman—Robert E. Reynolds, Lockheed Aircraft Corp.

X-Ray Focal Spot Measurement—By D. T. O'Connor and D. Polansky, Naval Ordnance Laboratory.
A Preliminary Investigation on the Radiographic Visualization of Cracks—By J. W. Dutli and G. H.

Tenney, Los Alamos Scientific Laboratory.

Some Unusual Radiographic Problems—By Michael D. Phillips, Merle L. Rhoten and Clara Kimmel, Battelle Memorial Institute.

An Investigation of Xeroradiography of Uranium with High Energy Sources—By R. E. Cofield, Carbide & Carbon Chemicals Co., Y-12 Plant, Oak Ridge.

Tuesday, October 20—9:00 A.M.

Betatron Radiography

Chairman—Richard F. Holste, General Electric Co.

Co-Chairman—Carlton H. Hastings, Watertown Arsenal

Characteristics of High Energy X-Rays—By A. L. Pace, X-Ray Department, General Electric Co.
The Industrial Application of the 22 Mev Betatron—By H. B. Norris, Inspection Department, Allis-Chalmers Manufacturing Co.

Some Experimental Findings and Operating Practices in Betatron Radiography at Los Alamos—
By Norman C. Miller and John D. Steely, Los Alamos Scientific Laboratory.

Magnescanning (Betatron Magnification and Scanning Techniques)—By A. N. Haig, Betatron Engineering, Allis-Chalmers Manufacturing Co.

Further Investigations on the Industrial Use of the 31 Mev Betatron—By R. W. Wideree, Brown Boveri & Co.

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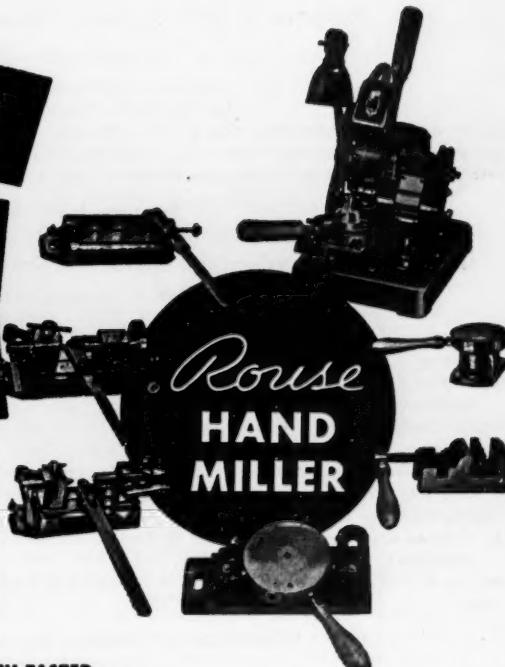
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Program of SNT Technical Papers—Continued

Tuesday, October 20—2:00 P.M.

Chairman—Robert C. McMaster, National President
Co-Chairman—National Officers

de Forest Award—Magnaflux Corporation, Chicago.

Coolidge Award—General Electric Co., X-Ray Department.

Lester Honor Lecture—Adair Morrison, Arthur D. Little & Co.—“Field Application of Radiography.”

Business Meeting

Wednesday, October 21—9:00 A.M.

Isotopes and Problems of Nondestructive Testing Here and Abroad

Chairman—William K. Lonsdale, James H. Herron Co.

Co-Chairman—George T. Taylor, Radium Chemical Co., Inc.

Radioisotopes in Nondestructive Testing—By Paul C. Aeberold, Director, Isotope Division, Atomic Energy Commission.

Application of Cesium-137 to Industrial Radiography—By Grover M. Taylor, Los Alamos Scientific Laboratory.

Quality Control Through Radiography as Offered by the Independent Commercial Laboratory—By Alan S. Kollock, President, Industrial X-Ray, Inc.

Nondestructive Testing in Great Britain—By Robert Bentley, Ferranti Ltd., England.

Nondestructive Testing and the Society for Nondestructive Inspection in Japan—By Vichi Hashimoto, Professor of the Tokyo University.

The Gamma-Rays Machine—By Paul R. Oakes, Vice-President and General Manager, Gamma Industries, Inc.

The Use of Iridium-192 and Cobalt-60 in Industrial Radiography—By W. A. McCarthy, Tracerlab, Inc.

Wednesday, October 21—2:00 P.M.

Ultrasonics

Chairman—William C. Hitt, Douglas Aircraft Co.

Co-Chairman—John C. Smack, Sperry Products, Inc.

Calibration Problems in Ultrasonics Testing—By H. E. Van Valkenburg, Research Engineer, Sperry Products, Inc.

Inspection of Metals with Ultrasonics Surface Waves—By Willard C. Minton, Application Engineer, Sperry Products, Inc.

Immersed Ultrasonics Inspection with Automatic Recording or Warning Signal—By John C. Smack, Staff Engineer, Sperry Products, Inc.

High Resolving Power Ultrasonic Flaw Plotting Through Use of Frequency Modulated Ultrasound—By Don Erdman, President, Electro Circuits, Inc.

Bi-Plexing Applications of the Improved Mark Eight 2-Ray Machine, a dual sonal coordinating scan computer—By H. H. Staats, Manager, Magnaflux Corp.

Thursday, October 22—9:00 A.M.

Magnetic Particle and Penetrant Inspection

Chairman—Hamilton Migel, Magnaflux Corp.

Co-Chairman—C. M. Tucker, Aluminum Co. of America

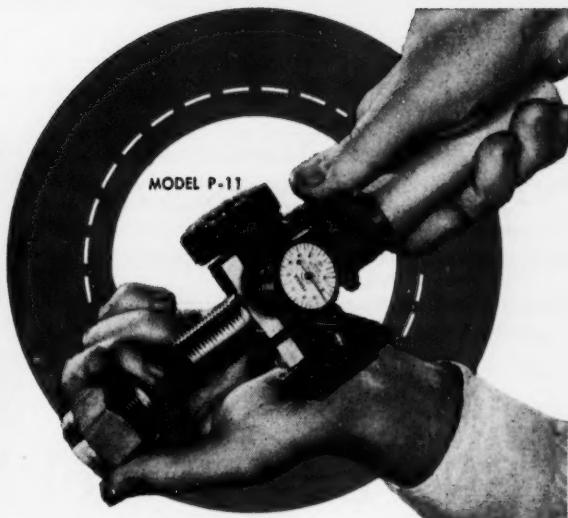
Recent Developments in Penetrant Inspection—By A. Robinson, General Electric Co., Thompson Laboratories.

Factors in Use of Black Lights for Fluorescent Inspection—By J. E. Clarke, Research Director, Magnaflux Corp.

Application of Magnetic Particle Inspection in Refineries—By T. C. Wilson, Assistant Chief Inspector of Refineries, Sinclair Refining Co.

Role of Nondestructive Testing in Ford Motor's Quality Control Program—By D. C. Hart, Quality Control, Ford Engine and Foundry Div., Ford Motor Co.

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Program of SNT Technical Papers—Continued

Thursday, October 22—1:30 P.M. Eddy Current and Related Subjects

Chairman—H. N. Staats, Magnaflux Corp.

Co-Chairman—Cecil Farrow, Republic Steel Corp.

Electronic Thickness Gage for Measuring the Thickness of Metallic Coatings—By Abner Brenner, Chief, Electrodeposition Section, National Bureau of Standards to be delivered by Jean Garcia-Rivera

Nondestructive Testing by Eddy Current Methods—By Richard Hochschild, Physicist, Hanford Operations Office, USAEC

Practical Nondestructive Testing with Conductivity—By William A. Cannon, Jr., Engineer, Magnaflux Corp.

SNT Educational Lectures

Suite 316, Hollenden Hotel

Monday, October 19—9:00 A.M.

Orientation Lecture covering the broad purposes and benefits of Nondestructive Testing—By S. A. Wenk, Battelle Memorial Institute.

Sources of Defects Located by Nondestructive Testing—By C. S. Betz, Magnaflux Corp.

Radiography—By R. G. Tobey, Eastman Kodak Co.

Magnetic Particle Inspection—By W. E. Thomas, Magnaflux Corp.

Monday, October 19—2:15 P.M.

Testing with Ultrasonics—By J. C. Smack, Sperry Products, Inc.

Inter-Relation of Various Testing Methods—By A. Cota, A. O. Smith Corp.

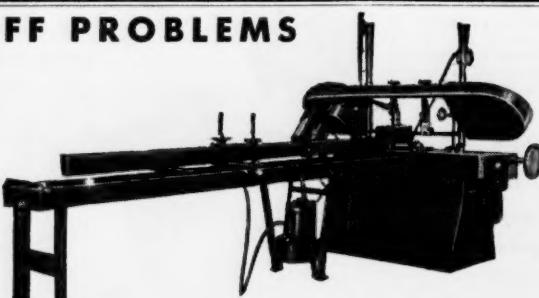
Evaluation of Indications of Discontinuities—By J. H. Bly, X-Ray Inc.

Question Period.

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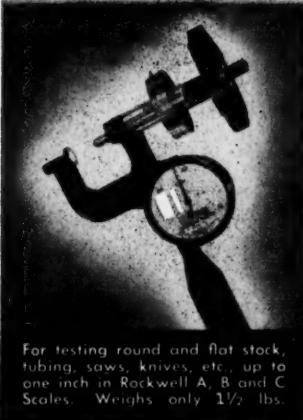
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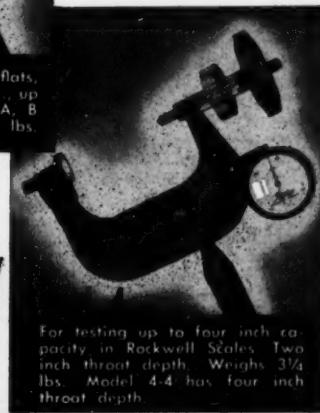
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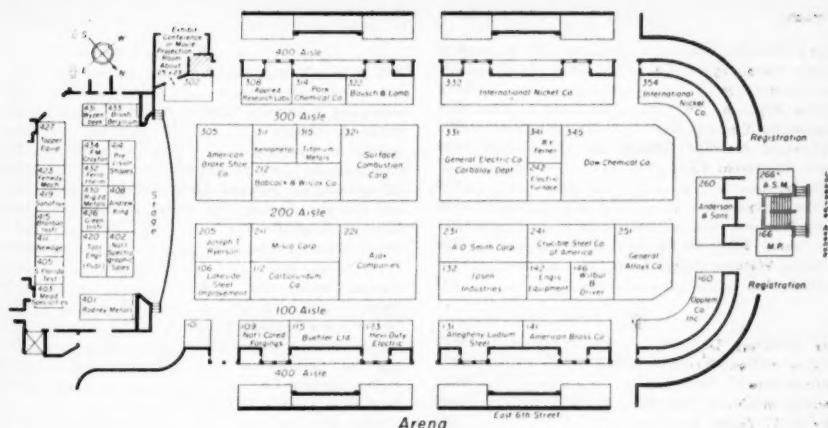
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Affiliated Gas Equip., Inc.	2739	The Babcock & Wilcox Co.	212
Ajax Electric Co.	221	Baird Associates, Inc.	2012
Ajax Electrothermic Corp.	221	Baker & Co., Inc.	1842
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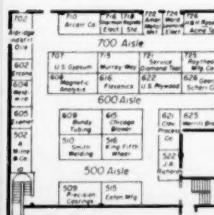
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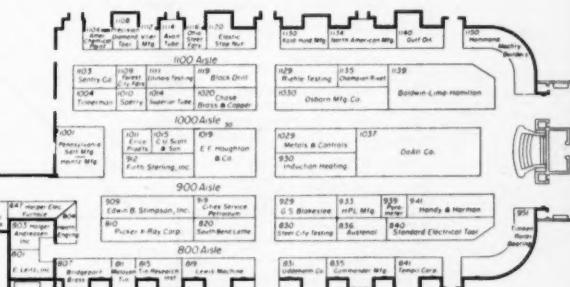
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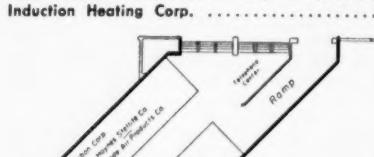
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Main Exhibition Hall

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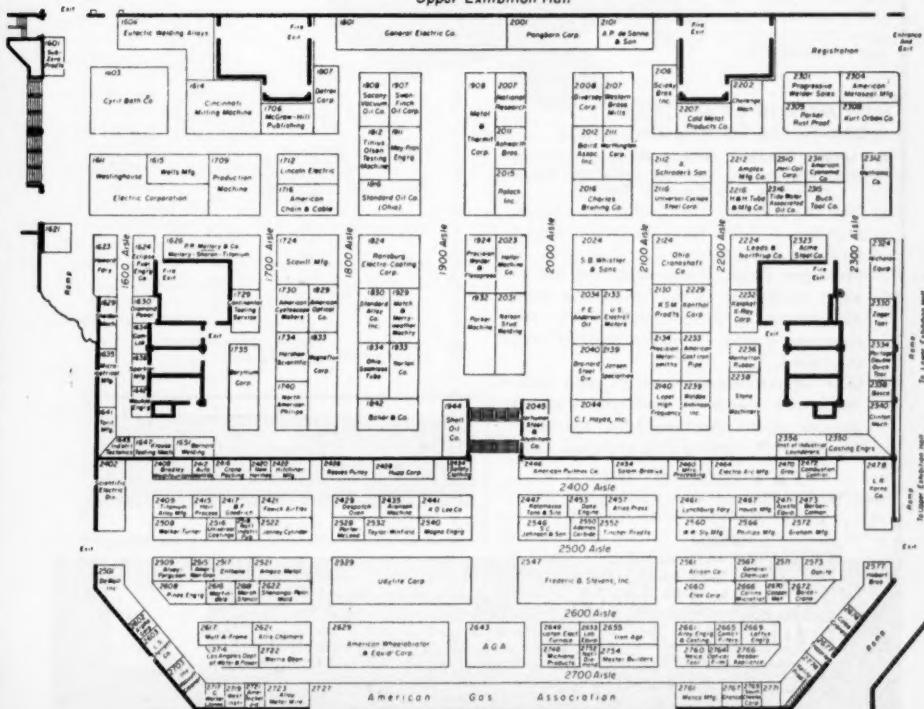
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The International Nickel Co., Inc.	332, 354	King Fifth Wheel Co.	516
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Ipseu Industries, Inc.	132	Korhumei Steel & Aluminum Co.	2045
Iron Age	2655	Krouse Testing Machine, Inc.	1647
		Krueger Mfg. Co.	1410

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Jarrell-Ash Company	1427
Jensen Specialties, Inc.	2139
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C. Walker Jones Co.	2717

14

K S M Products, Inc.	2130
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The Kanthal Corporation	2229

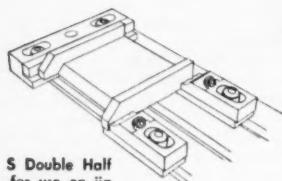
Upper Exhibition Hall



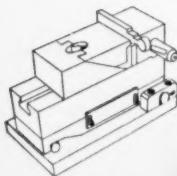
Eliminate U-Clamps, Straps and Fingers

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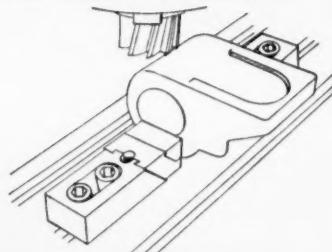
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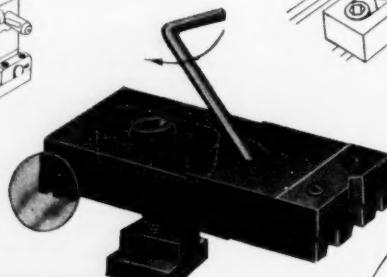
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New larger "Jumbo" and "Lil-Giant" clamps for use on larger-type planers.

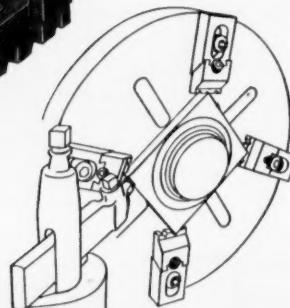


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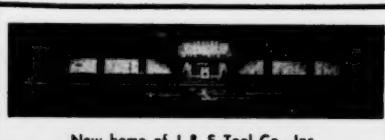
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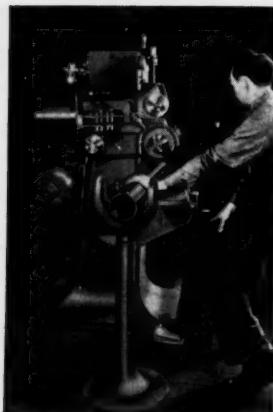
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National Bearing Division	305
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Sherman Electric Co., Inc.	716		T
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Sparkler Mfg. Co.	1638	Titanium Metals Corp. of America	315
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The L. S. Starrett Co.	2603	Tubular Micrometer Co.	1621
Steel	1409	Turco Products, Inc.	1406
Steel City Testing Machines, Inc.	830		U
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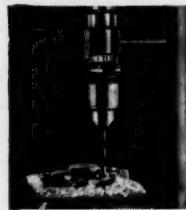
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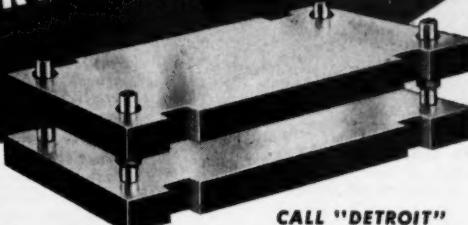


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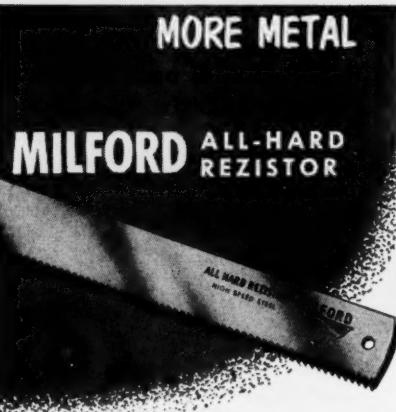
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Universal-Cyclops Steel Corp.	2116
Upton Electric Furnace Co.	2649

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Vacuum Metals Corp.	2007
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Vanadium Corporation of America	1325
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Olin Industries, Inc.	2107
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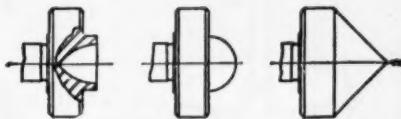
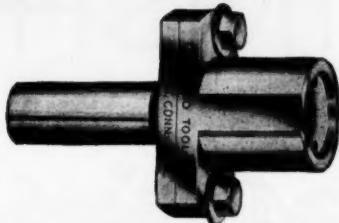
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A NEW TOOL FOR YOUR SCREW MACHINES WHICH SERVES A DUAL PURPOSE

REVOLVING STOP — Used as a stop, the new Alco Revolving Stop prevents abuse of the work ordinarily caused by roughness, imperfections or chips which accumulate on a stationary stop. The disc in the Alco Stop revolves concentrically with the work with the concentric action quickly adjustable by the floating alignment feature of the tool. Oil will not splash when the work contacts the stop because the revolving disc is below the outside casing.

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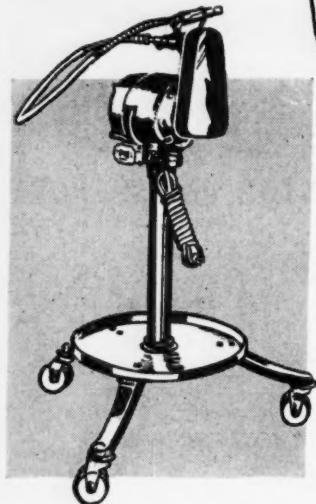
Eliminates chatter marks caused by vibration . . . No friction between the stop and the work . . . Increased feeds on forming . . . Rigid support on long pieces.

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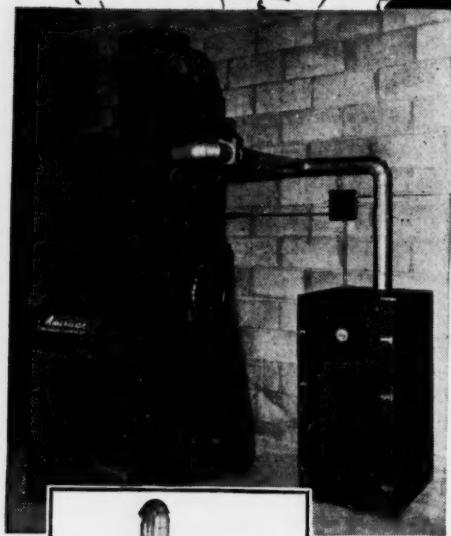
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Automatic DRILLING UNIT

Mousetrapped...



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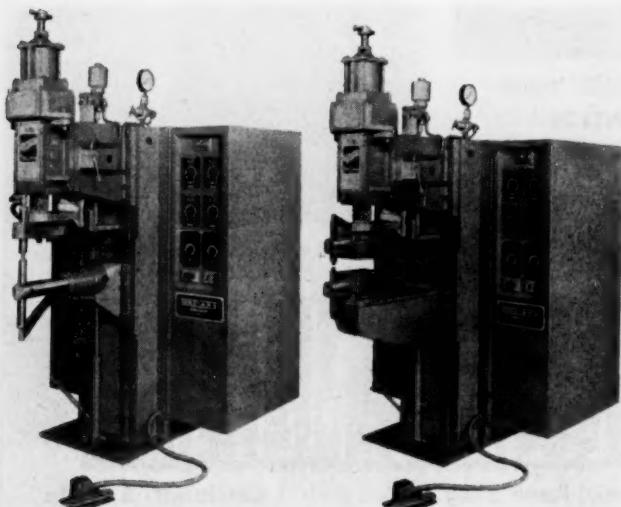
On Exhibit at

The Research & Control Instruments Division, North American Philips Co., Inc., Mount Vernon, N. Y., will occupy Booth No. 1740 and will exhibit X-ray diffraction equipment, including the Wide-Range Goniometer, powder cameras and accessories, the Wide-Range Diffractometer and 90-degree Diffractometer, and the Spectograph. Also on display will be the Philips Electron Microscope. Personnel will be on hand to explain and demonstrate the proper use of the various types of equipment.

A completely new line of resistance welding machines will be introduced by Sciaky Bros., Inc., Chicago 38, Ill., in Booth No. 2106. The new line is designed specifically for commercial applications requiring large production runs of high-quality welds. Among the machines to be exhibited will be the SPT 2 Spot Welder (left illustration) which can make high-quality welds on large production runs on two thicknesses of clean mild steel in minimum gauges of 0.020 inch and maximum gauges of 0.102 inch; of stainless steel in minimum gauges of 0.020 inch and maximum gauges of 0.062 inch; and of aluminum in minimum gauges of 0.025 inch and maximum gauges of 0.072 inch. The welder is available in 50, 75, and 100 kva at 50 per cent duty cycle and can be supplied in from 18 to 60-inch throat depths and with 1,500 to 4,000-lb. maximum electrode force. The SPT 2 can also weld many other types of materials and alloys, such as brass, Everdur, heat-resistant alloys, coated steel, and so on, within the limits of electrode force and secondary current.

Also to be exhibited will be the EPT 2 Projection Welder (right illustration) which can be supplied as a combination projection and spot welder. The combination welder, designated as the ESPT, will make quality spot welds on large production runs on two thicknesses of clean mild steel in minimum gauges of 0.020 inch and maximum gauges of 0.203 inch; of stainless steel in

minimum gauges of 0.022 inch and maximum gauges of 0.125 inch; and of aluminum and other light alloys in minimum gauges of 0.025 inch and maximum gauges of 0.102 inch. The machine is available in 50, 75, and 100 kva at 50 per cent duty cycle and can be supplied in 12, 18, and 24-inch throat depths and with maximum electrode force of 4,000 lb. The machine can also weld many other types of materials and alloys within the limits of electrode force and secondary current.

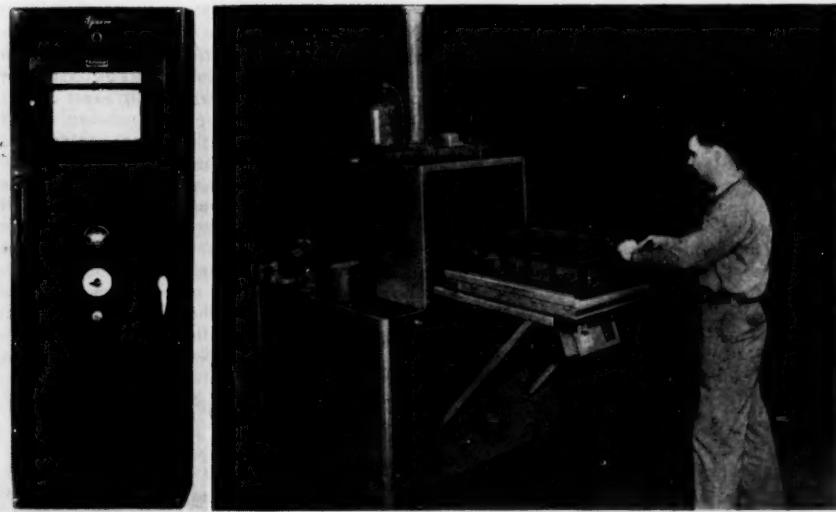


the Metal Show

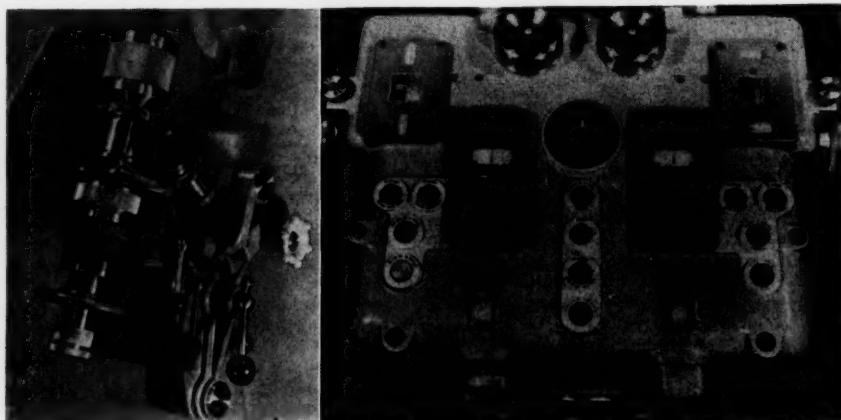
Ipsen Industries, Inc., Rockford, Ill., will show, for the first time, in Booth No. 132 an automatic dew point controller (left illustration) which regulates atmosphere dew point in controlled atmosphere metal treating furnaces. The self-contained unit, which operates electronically, continuously records and controls the furnace dew point and is adjustable to meet any required dew point within the capacity of the particular furnace to which it is attached. The dew point controller pumps furnace atmosphere through a 5/16-inch steel tube and, by the use of a cooling element, condenses water on a measuring device. This condensation temperature is measured electrically, then indicated, recorded, and controlled. The unit is said to be capable of measuring the dew point directly, and ammonia in the furnace atmosphere does not harm or affect accuracy of the measurement. Using standard attachments, the dew point controller is available for use on all metal-treating units utilizing controlled atmosphere.

Ipsen's W-25-E Automatic Washer (right illustration) for metal cleaning, a miniature unit, will be in complete operation using Ipsen Cleaning Compound, washing metal parts. The forced-circulation washer is available in three different sizes and is designed to speed metal cleaning through automatic cycling and by combining washing and rinsing in a single operation. Solution temperatures, work handling, and cycles for solution circulation and skim-off are all controlled automatically by pre-settings on a panel conveniently located on the front of the washer. The unit is said to be especially adapted to line operations, as well as a wide variety of standard degreasing and oil removal applications.

The T-400-GM Automatic Controlled Atmosphere Heat Treating Unit featuring 100 per cent forced convection heating will also be on exhibit. The unit operates at temperatures up to 1,850 deg. F. and has complete automatic straight-through operation from heat through cooling or oil quench. Also shown will be the D-400-E Automatic Controlled Atmosphere Tempering Unit which is designed for both bright, scale-free tempering and controlled oxidation tempering from 400 to 1,400 deg. F. The furnace is a fully automatic, sealed unit with the heating chamber separated from the combination cooling chamber and quench tank by a sealed inside door.



ON EXHIBIT AT THE METAL SHOW



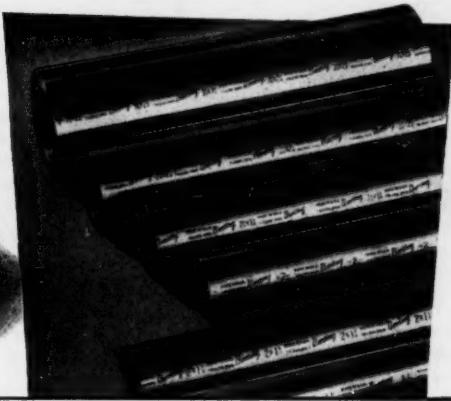
A newly developed web-thinning attachment (left illustration) will be demonstrated for the first time in conjunction with the Cawi-Spiral Grinder by Kurt Orban Co., Inc., New York 17, N. Y., in Booth No. 2308. Web-thinning operations with the new attachment are performed on a second grinding wheel already incorporated for manual web-thinning on all existing Cawi-Spiral Grinders. A major feature of the attachment is a push-button indexing device which turns the chuck and drill, after thinning one side of the web, so that the grinding wheel enters the reverse side of the drill in exactly the same position. Thus, only a single chucking operation is needed for both grinding and web-thinning. Provision is made for tilting the entire attachment to conform with the lead of the drills; for adjusting the depth of thinning of the web; for angular setting of the drill in position to the grinding wheel; and for raising or lowering the chuck to conform to the length of the drill. The entire attachment can also be moved parallel to the machine spindle.

Also to be shown will be Lindner Jig Borers incorporating the new preselective Autopositioner (right illustration). With the Autopositioner, the operator can preselect the table position for the next hole while one boring operation is in progress. An optical projection system of making settings, in conjunction with a photoelectric zero point indicator, permits exact centering with a minimum of visual fatigue and with the human error factor greatly reduced. Speed and accuracy of the preselected table positioning are made possible by the optical-photoelectric centering devices, two of which are included in the Lindner Autopositioner, one for longitudinal table position, the other for transverse. An illuminated projection screen with an integral reticle shows an image of the desired location line from the cylindrical measuring scale. As this image approaches the reticle, the photoelectric system is energized, and a pointer swings in the direction of the optical image. As the image approaches the center of the reticle, the pointer follows its motion. When the image is exactly centered, the pointer also reaches center position. By means of a switch on the Autopositioner, either one of two methods can be chosen for the preselection of table settings; the coordinate method, in which the positions of all holes are expressed in terms of their distances from a fixed zero point; or the additive method, in which each hole is positioned by its longitudinal and transverse distance from the preceding hole. Basic principles of operation of the Autopositioner are the same in either case.

In Booth 2024, S. B. Whistler & Sons, Inc., Buffalo, N. Y., will exhibit and have in operation 90-degree perforating units, magnetic punches and dies, and adjustable perforating units.

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Bunting Precision Bronze Bars are especially designed for maintenance work. Completely machined and finished on all surfaces, they save costly machining time, wasted metal and wear on cutting tools. They run true when centered in your lathe. Made of the finest Bearing Bronze—Bunting No. 72 (S.A.E. 660). Always carried in stock by your local Bunting Distributor.

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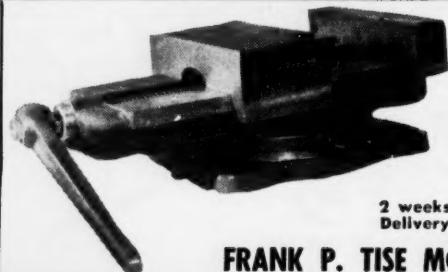


ON EXHIBIT AT THE METAL SHOW



In Booth No. 403, Mead Specialties Co., Chicago, Ill., will exhibit four variations of its column press. One adjustable stand accommodates air cylinders with either a 3 or 4-inch bore, either single or double-acting. The double-acting cylinders, illustrated here-with, can be furnished with any length of stroke from 0 to 36 inches and have a 4-inch stroke. The single-acting cylinders have a maximum stroke of 4 inches, and return stroke is by internal spring. The upper ram of the double-acting press is provided with depth stop nuts and collars to regulate the stroke exactly within the limits of the cylinder ordered. The single-acting press has no upper ram or depth stop adjustment. The mounting bracket permits both vertical and radial adjustment. The column is solid steel, and the table is machine surfaced but not hardened to allow for mounting of special tooling.

To back up its theme of "automation in the modern plant," the exhibit in Booth No. 1611 of Westinghouse Electric Corp., Pittsburgh, Pa., will contain an unusually large number of major new apparatus. Each new unit will be evaluated on the basis of its relation to in-line production in the metal-working plant. Following are the products that will be shown for the first time: a new, smaller, lighter d.c. rectifier arc welder; a new gas-fired shaker hearth furnace with radiant tubes and a protective atmosphere, designed to handle small parts; a new x-ray productograph for conveyor line x-ray operation in handling castings or fabricated parts; and a new 25-kw. r-f generator for induction heating. Other displays will include an x-ray fluoroscope, three magnetic amplifier demonstrations, and an automatic welding setup. The shaker hearth furnace to be shown has a capacity of 500 lb. of bolts per hour when operated at normal heat-treating temperature for bolts (approximately 1,575 to 1,650 deg. F.). The unit will be completely assembled and the hearth will be operated. In addition to the furnace proper, an Endogas generator and other accessories will be shown. The 25-kw. r-f generator induction-heating display will feature a new power control system that uses static components instead of electronic tubes. This display will also show a built-in heat-exchanger water-cooling system that saves on water costs and makes the full 25 kilowatts of output power available for useful work. A phono-mimic scheme will be used to coordinate the various displays.



A black and white photograph of a graduated swivel vise. The vise has a wide, adjustable jaw opening. It is mounted on a base with a slot for a tee slot bolt. A handle is attached to the side of the vise. The text "2 weeks Delivery" is printed below the vise.

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**Graduated Swivel Vise
for Shapers**

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13½" vise opening. Base, 12" x 14".
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ON EXHIBIT AT THE METAL SHOW



under development and are expected to be displayed and demonstrated for the first time. This range is of particular interest in preheating for welding, tempering of tool steels, shell molding, and a number of other important industrial applications. Including the newly developed items, Tempil[®] products are now available in 12 or 13-degree steps from 113 to 500 deg. F. plus the recently-added 525-deg. F. rating, and in 50-degree steps from 550 to 2,000 deg. F. In addition, Tempil[®] Pellets are available for the temperature range from 2,050 to 2,500 deg. F. inclusive. A new Tempilaq[®] Protective Coating will be demonstrated for application where Tempilaq[®] is likely to come in contact with water, oil, or grease. The protective coating is applied over the Tempilaq[®] layer after the latter is thoroughly dry. The transparent film developed in this manner will function satisfactorily up to 400 deg. F., is impervious to oil, water, and grease, and will permit the melting of the Tempilaq[®] to be clearly visible.

Tempil[®] Corp., New York 10, N. Y., will exhibit its line of temperature-indicating materials in Booth No. 841. The Tempil[®] technique of determining attained temperatures will be demonstrated on heated workpieces. Tempilstiks[®], Tempilaq[®], and Tempil[®] Pellets for 413, 425, 438, 463, 475, and 488 deg. F. are now

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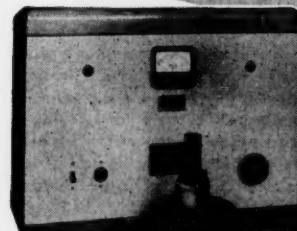
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Ideal for

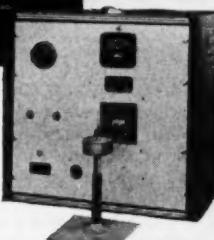
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The Lepel line of induction heating units represents the most advanced thought in the field of electronics as well as the most practical and efficient source of heat yet developed for industrial heating. With a background of half a century of pioneering electrical and metallurgical experience, the name Lepel has become the symbol of induction heating equipment embodying the highest standards of engineering achievement, dependable low cost operation and safety.

Amazing in its speed, Lepel equipment reduces the time required for hardening, annealing, stress relieving, brazing, soldering and melting from minutes to seconds. It performs these operations with a degree of precision and uniformity rarely attained through other processes.

LEPEL Electronic Tube GENERATORS available from 1 kw to 100 kw.
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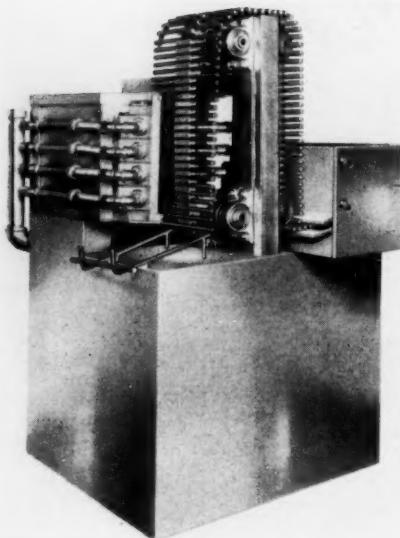


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ON EXHIBIT AT THE METAL SHOW



The G.A.S. "Hot Rod" End Heating Unit, which is said to be ideally suited for rod end heating, including upsetting, bolt heading, swaging, localized hardening, and so on, will be exhibited in Booth No. 2753 by Gas Appliance Service, Inc., Chicago, Ill. Using production figures based on heating a 4-inch end-section of $\frac{1}{2}$ -inch rod, the unit is claimed to bring the rod to 1,900 deg. F. in 50 seconds, with an hourly production of 900 rods on the model illustrated. Similarly, a $\frac{3}{4}$ -inch rod is said to reach the same temperature in 75 seconds with an hourly production of 600 rods. Equipped with a conveyor and automatic hopper feed, the unit is designed to handle stock sizes of rod from $\frac{1}{4}$ to $1\frac{1}{2}$ inches in diameter, with varying number of burners to suit the particular stock and production to be handled. The length of section heated may be up to 4 inches and the overall length of pieces 6 to 24 inches.

In Booth No. 141, the American Brass Co., Waterbury, Conn., will feature Formbrite Drawing Brass, a metal which is strong, hard, and springy, yet retains remarkable ductility for forming, drawing, and embossing. One of Formbrite's principal qualities is said to be its unusual polishing characteristics and, to illustrate this, a four-station automatic index buffer will be in operation, polishing Formbrite cups measuring 2 inches in diameter x 1 inch deep. A large magnifying glass will be provided for close inspection of the samples. In addition, hundreds of end-use items made of Formbrite, plain and plated, will be on display. Other products to be shown will be Anaconda Welding Rods and an assortment of repair welded parts. Automatic projection of Kodachrome slides will show modern welding procedures with Anaconda rods. The company will also exhibit display boards of phosphor bronze and nickel silver, in addition to flexible metal hose and tubing, as well as eyelets, cups, shells, stampings, and other formed parts.

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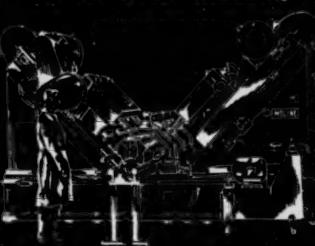
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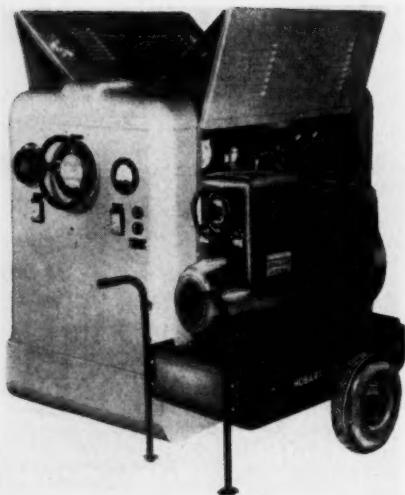
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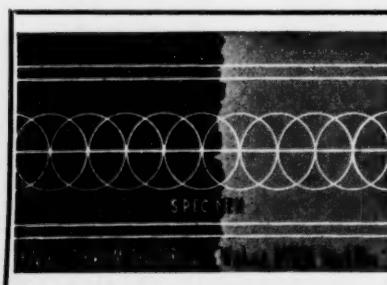
MANUFACTURERS OF STANDARDIZED DRILL JIG AND FIXTURE BUSHINGS

ON EXHIBIT AT THE METAL SHOW



The Hobart Brothers Co., Troy, Ohio, will exhibit for the first time two entirely new air-cooled gasoline engine driven arc welders in Booth No. 2577. One is a 200-ampere d.c. arc welder powered by a 2-cylinder Wisconsin air-cooled engine. Measuring only 38 inches long x 21 1/4 inches wide x 35 5/16 inches high, this unit is compact and lightweight for easy loading and hauling to any job. The other is a combination 200-ampere a.c. arc welder and 5-kw. a.c. power unit. By merely throwing its change-over switch to "welder" makes the unit a high capacity 200-ampere a.c. arc welder; throwing the switch to "a.c. power" immediately converts the generator into a single-phase, 110-volt, 60-cycle power plant of 5-kw. capacity—sufficient to run fifty 100-watt lamps or floodlights, or a total of 6 h.p. of motors. This unit is powered by a Wisconsin 4-cylinder air-cooled engine. Portable mountings are available for both models. In addition, a complete line of d.c. and a.c. arc welders, electrodes, and accessories will be exhibited.

The exhibit in Booth No. 1712 of The Lincoln Electric Co., Cleveland 17, Ohio, will feature several new developments in automatic welding. One new automatic welding development to be shown is the Spreadarc, a type of equipment that oscillates a standard welding head from side to side to create a wide bead. Another feature will be the new Twinarc equipment for adapting a standard welding head for multiple arc welding. The use of two arcs with one welding head rather than using two complete heads simplifies the control and operation of multiple arc welding. In Twinarc welding, two electrode wires are fed through a single contact jaw to the work. The two wires create two arcs which may be operated either side by side or in tandem. The company will also introduce agglomerated fluxes for automatic hardsurfacing. Hardsurfacing is accomplished using a mild steel electrode wire with a special agglomerated flux containing the hardsurfacing alloy. Another piece of equipment to be displayed will be the new Inertarc welder, a new a.c. welding machine for inert-gas-shielded arc welding. It employs a new method of preventing rectification of current and high frequency interference with radar, television, and radio communication.



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Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over or under stock size to .007-without adjustments. All grip...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

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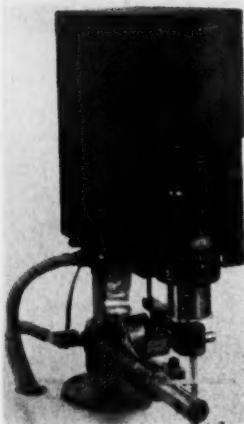
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ON EXHIBIT AT THE METAL SHOW



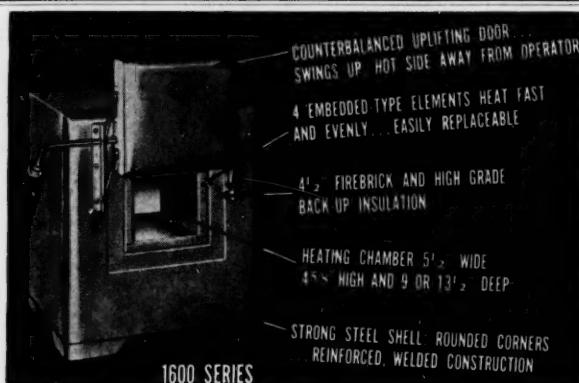
In Booth No. 725, Raytheon Mfg. Co., Waltham 54, Mass., will exhibit the latest units comprising its "Weldpower" line of welding equipment, with all units in full operation. On display will be the new "ILS" head (illustrated) which replaces the former "G" head and which is designed for use with the Model 225A "Weldpower" control unit. Press type and foot operated, the unit is equipped with accurate pressure and follow-up controls, as well as a visual pressure scale. The lower electrode may be used on a vertical or horizontal plane, thus adding versatility to the unit. Various welds with all kinds of metals and alloys will also be displayed.

Cost reducing methods used by steel producers, drop forge operators, and a wide range of other metal-working industries to overcome difficult materials handling problems will be featured by the Nelson Stud Welding Division, Gregory Industries, Inc., Lorain, Ohio, in Booth No. 2031. New Nelson studs developed for these applications will be shown. Nelson will also show a newly developed stud brazing technique in which the portable

Nelson stud welding gun can be used for fastening to light gauge sheet metal and to non-ferrous materials. The process, which uses silver solder and also a flux, has been under development by Nelson research engineers for over two years. Samples of hollow pipe studs which serve as bleeder valves on various types of process equipment will also be exhibited.

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Temco bench-
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No. 2B POSITIVE TAPPER — capacity $\frac{3}{8}$ " to $\frac{7}{8}$ " in Steel.

No. 3A POSITIVE TAPPER — capacity $\frac{1}{2}$ " to $1\frac{1}{4}$ " in Steel — $\frac{1}{2}$ " to $\frac{3}{4}$ " Pipe Taps.

No. 4A TAPPER — capacity $\frac{3}{8}$ " to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

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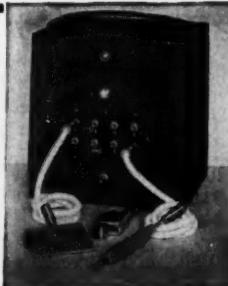
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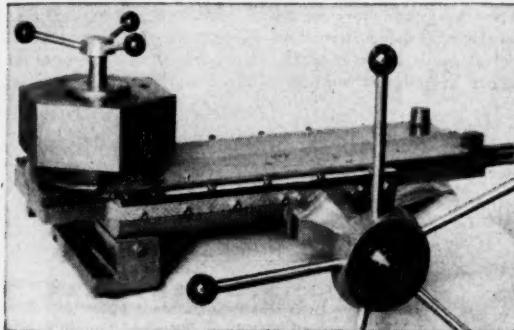
Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

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P. O. Box 191 Tenafly, N. J.

LYNN TURRET SERIES F-BT3 — for Lathe Swing 15"-to-26"



Head	9 $\frac{1}{2}$ "
Tool Hole	.....	1 $\frac{1}{2}$ " to 2"
Working Travel	.....	10 $\frac{1}{2}$ "
Over-all Length	.....	35"
Swings 6" Box Tools		
Weight	.....	470 lbs.

Self-Indexing for Fast Production
Easily Adjustable for Alignment
and Wear

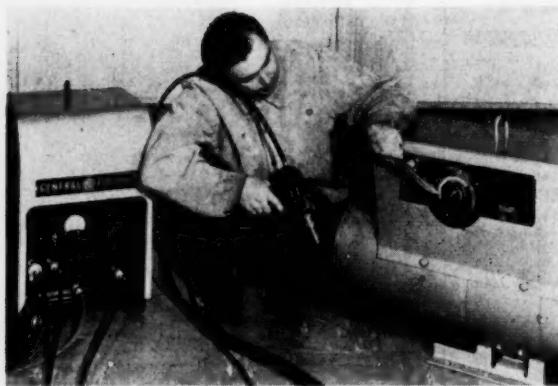
Less Experience Needed to
Operate

Only manufacturer of
conversion turrets.

Turrets available for smaller Lathes
WRITE, OR PHONE ATLANTIC 7267

LYNN MANUFACTURING CO.
1121 SOUTH SEVENTH ST. MINNEAPOLIS, MINN.

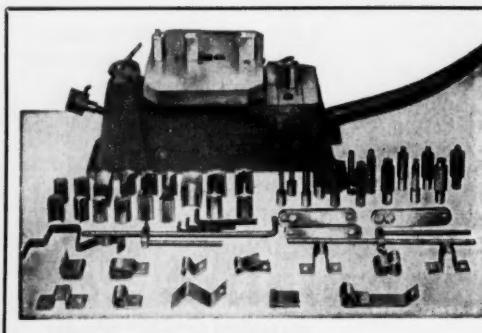
ON EXHIBIT AT THE METAL SHOW



gas-shielded process. The process can be used in down-hand, vertical, or over-head positions to weld aluminum of any alloy in thicknesses from $1/32$ to 3 inches and stainless steel from $1/16$ to 1 inch.

A novel question-and-answer panel will be used in the industrial heating section of the exhibit with color transparencies presenting a comparison of the results of various methods of metal processing. Hardening, atmospheric-protecting, galvanizing, annealing, and brazing processes will be discussed in the panel. The display of synchronous welding control for low-resistance welding will feature the first showing of the new G-E temperature-controlled ignitron tube for water conservation and over-temperature protection in resistance-welding control panels. The company's ultrasonic generator, which uses high sonic waves in its cleaning operation, will clean small metal parts for inspection by visitors.

An industrial power systems display will feature low-voltage switchgear and distribution transformers. Visitors will be able to see how capacitors cut power costs and improve efficiency by checking meters hooked into a motor circuit using capacitors. Pyrometers, thermocouples, and leak detectors are included in the list of other products to be displayed. The advantages of a sound productive maintenance program in industry will be brought out in a special panel discussion.



Multiform

BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds Into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

AIR OR HAND MODELS FOR UP TO $1/4$ " to 4" MATERIAL

Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.
Dept. 6 M Kalamazoo, Mich.

IMPORTANT NOTICE**The Genuine MAUSER
VERNIER CALIPER****IS NOW MADE OF
STAINLESS STEEL
THROUGHOUT****\$14.75
PPD**AND THE FOLLOWING
IMPROVEMENTS HAVE BEEN ADDED

- SPECIALLY LONG VERNIER to read thousandths
- HARDENED PHOSPHOR-BRONZE adjustable gib retains accuracy
- GRADUATIONS in inches - 1/128" - 1/16 mm in back
- Recent Illustrated Folder showing complete line of MAUSER Toolmakers Calipers, Height Gages, Bevel Protractors and Tool Stands.

GEO. SCHERR CO., Inc. 200-MM Lafayette St., N.Y. 12

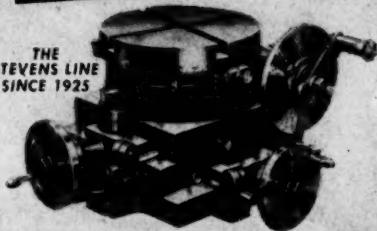
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MADE TO YOUR SPECIFICATIONS

LET US HANDLE
YOUR CAM PROBLEMS

BLOOMFIELD TOOL CORPORATION

37 Farrand St. Bloomfield, N. J.

COMBINED TRANSVERSE AND
CIRCULAR MOVEMENTS ON
STEVENS #1 COMPOUND TABLETHE
STEVENS LINE
SINCE 1925

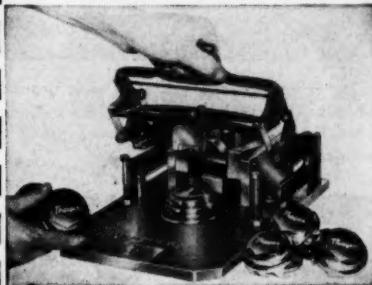
Combines 3 3/4" longitudinal and 3 3/4" transverse movements with circular movement of 7 1/2" Rotary Table. • Rotary Table and Compound Table can be used separately. • Larger No. 2 Compound Table also available.

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Rotary Tables • Multiple Spindle Index
Centers • Vises • Screw Head SlottersThe John B. Stevens Company
Main Street, Somersville, Conn., U. S. A.**ACROMARK**
MEANS "ACCURATE MARKING"

ENAMEL FILL

WITH COLOR, OR
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DIE-CAST, EMBOSSED
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PLASTIC PARTS WITH —

**The ACROPRINTER**

Reg. U. S. Pat. Off.

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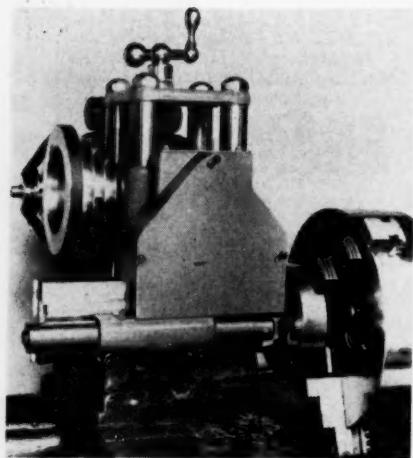
MARKING & NUMBERING MACHINES,
NAME-PLATE STAMPING MACHINES,
NAME-PLATES, STAMPS, DIES, TYPE,
METAL SIGNS,
METAL INKS,
BURNING BRANDS,
AND ALL KINDS
OF STANDARD OR
SPECIAL MARK-
ING EQUIPMENT
AND PRODUCTS.

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Latest Catalog.

ACROMARK
Company

9 MORRELL ST., ELIZABETH 4, N. J.
"THE ORIGINAL MARKING SPECIALISTS"

ON EXHIBIT AT THE METAL SHOW



tool bar is carburized, hardened, and ground on the outer surface and has a tapered socket for toolholders. The bronze ram, slide ways, and gib are hand scraped for accurate fit. According to the manufacturer, the machine is capable of producing cuts controlled in width to tolerances within 0.001 inch.

Versa-Mil Co., New York 36, N. Y., will introduce its newest addition, an internal keyseater, slotter, and shaper, in Booth No. 1230. The machine is said to be capable of cutting internal keyways from $\frac{1}{8}$ to 1 inch in width in bores from $\frac{1}{2}$ -inch diameter to any required size and can be set on a lathe carriage, as shown in the accompanying illustration, thus permitting the keyway to be cut with the same setup in which a hub is bored. The machine can also be used as a portable slotter or shaper and as a bench shaper. The stroke is adjustable from 0 to 5 inches in length and a full 360 degrees in angle. Interchangeable tool heads, it is claimed, provide "clapper" action which relieves the tool bit on the return stroke. An oil reservoir provides automatic lubrication for every rotating and sliding surface. A dovetail slide, which guides the stroke, is adjusted for fit by a tapered gib. The rocker arm and all toolholders are of hardened steel, and the

Chicago
MOUNTED **Wheels**

...now
even better with

79E BOND

**the new miracle
grinding wheel bond**

Greatest selection of sizes and shapes for every application. Best of all, deliveries are good . . . ready when you need them.

Try Chicago Mounted Wheels—bonded with 79E Bond—and you'll never buy any other! This tough new grinding wheel bond, exclusive with Chicago Wheel, has taken the industrial world virtually by storm, doing a better grinding job faster.

CHICAGO WHEEL & Mfg. Co.
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flex-tip*

blow guns

twice life of ordinary gun

No handles, springs, levers, triggers, push-buttons or packing to wear out—long, trouble-free life.

A PUFF OR BLAST

Special valve seat forms perfect seal—no air leaks. Flexing controls air from a puff to a blast. *Reg. U. S. Pat. Off.

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In Colorful Colorado

Valves • Filters • Regulators
Lubricators • Hose Assemblies

WHAT THE ENGRAVER SEES IN

PREIS-PANTO ENGRAVING MACHINE



PRECISION

BUILT

LIGHT IN
WEIGHT

Model
No. UE-3

The engraver sees the work and the copy—all within the working area. Precision engraving, of steel, all metals and plastic, is easy, with this machine. Write for details.

H. P. PREIS ENGRAVING MACHINE CO.
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Hillside, N. J.

PANTO

UNIVERSAL DRILL BUSHINGS

*the production-tools'
best friend*



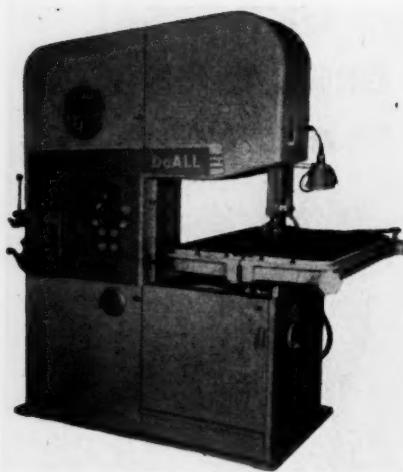
**reduce tool wear • help
prevent tool breakage •
prolong tool life**

Universal Bushings help keep tool costs down for several reasons: their super-finish bore helps reduce tool wear • their blended radius helps prevent tool hang-up and breakage • their 100% concentricity and hardness tests insure accuracy and uniform high quality • their knurled heads provide quick, sure grip • available in a complete range of standard diameters and lengths • For complete information, write to the office nearest you—Universal Engineering Sales Co., 1060 Broad St., Newark 2, N. J.; 5035 Sixth Avenue, Kenosha, Wis. — or the home office.

**UNIVERSAL
ENGINEERING COMPANY**
FRANKENMUTH 9, MICHIGAN

176-B

ON EXHIBIT AT THE METAL SHOW



A representative selection of a completely new line of band machines, which feature production sawing and versatility, will be introduced by The DoAll Co., Des Plaines, Ill., in Booth No. 1037. Featuring rigidity, wide speed ranges, and versatile hydraulic controls, the machine is said to be capable of performing a wide variety of operations, including production slotting, slitting, serrating, shaping, and notching. Also being introduced and demonstrated on the new band machine is the "Demon" high-speed steel saw band. The DoAll Power Cut-Off Machine, which features a completely centralized control panel, hydraulic controls including automatic feed pressure control, and a versatile coolant system, will also be displayed. The cut-off saw incorporates sufficient power to utilize the "Demon" saw band, and demonstrations of the new band will be conducted on the cut-off machine.

The versatility of DoAll Precision Surface Grinders will be demonstrated on a D6-1 tool-room grinder and a D10-3 production surface grinder equipped with automatic down-feed and automatic cross-feed controls. Augmenting the exhibit will be a new line of DoAll "Selectrons," magnetic chuck controls, which are integrated power units delivering infinitely variable power to magnetic chucks for holding and demagnetization. DoAll gage blocks, gages, gaging accessories, and the Micro-Step Gaging System will be included in the exhibit, along with the company's extensive line of cutting tools and industrial supplies.

The latest developments in impregnation sealing of pressure castings will be featured by Tincher Products Co., Sycamore, Ill., in Booth No. 29. A new plastic seal, marketed under the trade name "Imprex," which is designed to seal "coarse" porosity and even "squirters" will be on display. The seal is said to have excellent penetration properties which assure wall-to-wall impregnation. Also on display will be the company's "Imprex" Metallic Seal which has been improved to greatly increase penetration and permanency properties by means of a proportional sizing of mineral oxides in the sealant. A working model of the firm's Leak-O-Meter will likewise be included in the display. This compact instrument tests pressure castings for porosity.

ON OILY AND
GREASY FLOORS

STOP
COSTLY SLIPPING
ACCIDENTS

DEPT. RM-3

USE  **Tamms**
FULLER'S EARTH

Adds greatly to the safety of your shop • Provides safe non-slip footing • Absorbs oil and grease • Lessens fire hazard because, unlike saw dust or wood shavings, it is non-inflammable • Every shop needs this low cost safety aid.
A trial will convince you. Send for FREE SAMPLE.

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Accuracy in Surfaces
from which Measurements
start is **IMPORTANT...**



CAST IRON

G.S. Cast Iron Plates are
scientifically ribbed and
hand scraped by out-
standing experts.



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BLACK GRANITE

BLACK GRANITE
MICRO-FLAT "The Gift of Nature"

Black granite is the hardest material
nature has provided.

.00005" or .0001" Surface Precision.

We carry the finest in both materials
to fill your need for every requirement.

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200-MM LAFAYETTE ST. • N.Y. 12, N.Y.

INTERESTING PROPOSITION
FOR DEALERS EVERYWHERE

**BOOST PRODUCTION WITH
SINGLE ACTING**



Bore	Strokes	
	Horizontal	Vertical
1"	5/8"	5/8"
2 1/4"	1" 2" 3"	1" 2"
3"	1" 2" 3"	1/2" 2"
4"	2" 2 1/2"	2"
5"	3"	3"
6"	3"	2"

Air-Clamp*

*Pneumatic Cylinders



NEW CATALOG READY!

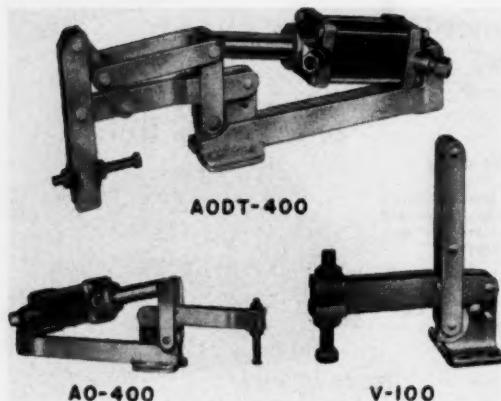
Complete line of simple, adaptable, compact spring-return air cylinders. Cut costs and speed up production the *modern*, Air Power Way. Write today.



MEAD SPECIALTIES COMPANY

4114 N. KNOX AVE. Dept. AA-103 CHICAGO 41, ILL.

ON EXHIBIT AT THE METAL SHOW



In Booth No. 1208, Lapeer Mfg. Co., Lapeer, Mich., will display its complete line of toggle-action clamps, pliers, and wrenches, as well as several new models which include the V-100, a midget clamp featuring a 100-lb. clamping force with spindle at the end of the toggle bar; the S-100, a side-mounted model of the V-100; the AO-400, an air-operated clamp for normal direct clamping; and the AODT-400, an air-operated 90-degree double-toggle clamp for around-the-corner clamping. In addition, the company will exhibit its brake bonding machine, designated as the "Knu-Bonder," and related equipment to handle brake and cycle bonding.

Norton Co., Worcester 6, Mass., will exhibit both abrasive and refractory products in Booth No 1933. To be introduced publicly for the first time will be Norton "Crystolon" Heating Elements for the production of precision grinding wheels. The electrically-fired tunnel kilns are said to require a minimum of maintenance and element life is up to 18 months. Cut-off wheels will also be featured, including the new Norton B9 and R50 wheels which will be demonstrated on a Stone cut-off machine. The B9 is an improved resinoid bonded cut-off wheel, and the R50 is an improved rubber-bonded wheel which has been designed to provide a high quality cut with no burr, burn, or case hardening of the ends of the work. The R50 wheel is designed for cutting solid stock. A companion wheel, the R20, which will also be shown, is designed especially for cutting tubing and hollow stock.

To demonstrate the use of tumbling abrasive for barrel finishing, a transparent plastic tumbling barrel will show the action within the barrel when parts are finished by this method. An actual "Esbec" bench-type finishing barrel will also be on display, and rough parts will be finished. Norton's "Touch of Gold" advertising theme will be used in the exhibit, brought out by Translite pictures which will also feature the recently introduced G bond grinding wheels. Refractory products for use in metal-melting and heat-treating furnaces will also be shown. Other refractory and abrasive products will make up the balance of the Norton exhibit.

An advertisement for Atlantic Gear Works. It features two large, detailed illustrations of gears, one on the left and one on the right, both with multiple teeth and some internal holes. The text is arranged in a grid-like layout within a rectangular border.

ATLANTIC GEARS

SPUR • SPIRAL • WORM

BEVEL GEARS GENERATED WITH
PRECISION ON MODERN EQUIPMENT.

Send SAMPLE or BLUEPRINT
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Call CAnal 6-1440

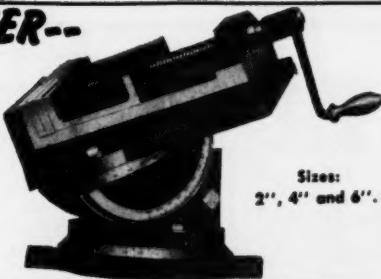
ATLANTIC GEAR WORKS Inc.

200 MM LAFAYETTE STREET • NEW YORK 12, N. Y.

MAKE SET-UPS **FASTER--**

Conserve valuable production time by using the fully universal, easily-operated **MASTER MULTI-SWIVEL VISE** for intricate, angular set-ups in your shop. Three swivels instantly set any compound angle. Used in shops throughout the world. Interchangeable platen optional.

Write for Circular
DONOVAN MFG. CO.
80 BATTERY MARCH ST., BOSTON 10, MASS.



Sizes:
2", 4" and 6".



Monarch Precision **SHAPLANE** Radius Tools

Illustration shows convex cutter for $\frac{1}{4}$ " to $2\frac{1}{2}$ " balls.

FIVE MODELS for LATHES, SHAPERS, PLANERS, BORING MILLS

Range $\frac{1}{2}$ " to 3" for concave Radii. Also heavy duty models for radii to 6" on planers, etc.

PATENT PENDING

Write for circular

C. B. TEETER, TOOL ROOM SPECIALTIES

4470 Oakenwald Ave., Chicago 15, Ill.

How **SQUARE HOLED SLEEVES** **SPEED UP TOOL-MAKING!**

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.



Patents Pending

SLEEVES MADE IN FOLLOWING SIZES:
3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4, 1"

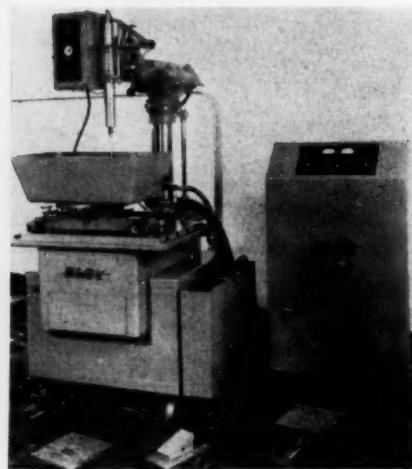
STURDY BROACHING SERVICE

23516 TELEGRAPH ROAD

DETROIT 19, MICH.

*Write for
Literature*

ON EXHIBIT AT THE METAL SHOW



Elox Corporation of Michigan, Clawson, Mich., will exhibit for the first time in Booth No. 2660 its newest development in the field of electrical discharge machinery. Designated as the M-400, the machine features a completely new power supply specifically engineered for precision tool and die work. According to the manufacturer, the unit will, with extreme accuracy, drill shaped and round holes in tungsten carbide and regular tool steels. The machine can also be used on diesinking operations, such as extrusion dies, cold header dies, and various other items. The company is sponsoring a contest for suggestions which will speed the development of even wider applications for the Elox M-400 model machine. The contest is open to all industrial editors and writers, engineers, and persons in allied fields. An award of \$500 will be made for the winning suggestions on new applications, and another award of \$500 will be given for the best descriptive name for the machine.

National Research Corp. and Vacuum Metals Corp., both of Cambridge, Mass., will share Booth No. 2007, featuring many items of interest to the metal-working and consuming industries. National Research will feature its high-vacuum coating, or metallizing, units which apply evaporated coatings of aluminum, zinc, copper, and other finishing materials, both functional and decorative, on paper, plastics, glass, and fabric, as well as on metal. One exhibit will be the Model 3111 (24 x 30-inch) Vertical Coater which is designed for limited production or development metallizing. The company will also introduce the modified vacuum fusion analysis apparatus for the rapid determination of hydrogen in steels. Vacuum Metals will exhibit applications of Ferrovac 52100, a vacuum-cast steel similar in composition to S.A.E.-52100, which is said to have unusual fatigue resistance. Other vacuum-cast ferrous metals, used for the manufacture of parts in which fatigue resistance is of extreme importance, will also be featured, including Ferrovac-4340 and high-temperature bearing steels.



Multiple Spindle Drill Heads

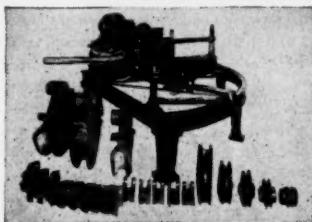
DURANT offers everything you need in top quality, high production multiple spindle drilling equipment with the broadest and most versatile line of standard models available, ranging from 2 to 20 spindles. All allow quick adjustment; eliminating high cost set ups. Models adjust as close as $\frac{3}{8}$ " on centers. Custom built models made to your specifications. Write for free catalog.

DURANT TOOL SUPPLY CO.
155 ORANGE STREET, PROVIDENCE 3, R. I.

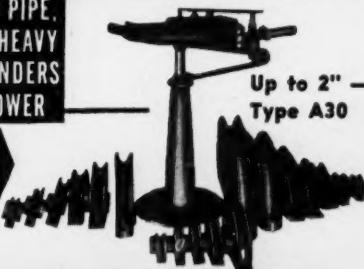
"The American"

LINE OF COLD PIPE,
CONDUIT AND HEAVY
WALL TUBE BENDERS
HAND AND POWER

ONE OF 10 HAND-OPERATED TYPES
bending cold pipe from $\frac{1}{4}$ "
to 6" I.P.S. inclusive



MOTOR-POWERED TYPE E AND F
5 and $7\frac{1}{2}$ h.p. — Bend up to
90° without a mandrel. Motor-
Operated capacities 2 $\frac{1}{2}$ " to
6" inclusive.



Up to 2" —
Type A30



COMBINATION BENDING TABLES

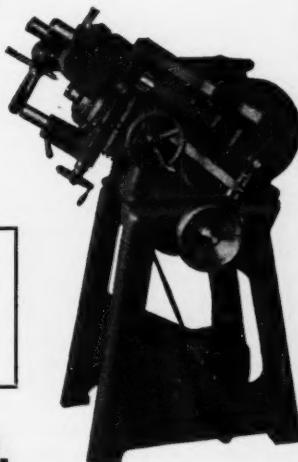
For hot or cold bends of various
shapes, pipes, bars, etc. 5' sq.; 7' sq.
($3\frac{1}{2}$ ' x 7' pairs) suitable for welding
together. Other sizes or custom made
to your specifications.

AMERICAN PIPE BENDING MACHINE CO., INC., 14 Furnace Street, Poultney, Vermont

Punches Shaped from the SOLID with OTTMANN Punch Shaper

FEATURES:

1. No holder plates required.
2. Simple work mounting.
3. No re-setting — Work can be adjusted to any position of tool.
4. Forms shaped accurate. Parallel and true.
5. Minimum hand work.
6. Convenient, simple operation. Uses standard shaping tools.



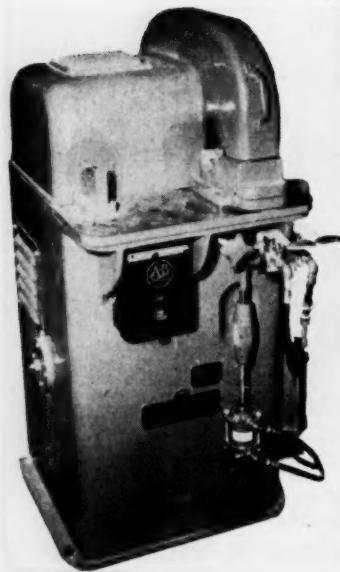
Write for Literature

CEDAR-WEST TOOL CO., INC.

90 WEST ST.

NEW YORK 6, N. Y.

ON EXHIBIT AT THE METAL SHOW



De Walt Inc., Lancaster, Pa., subsidiary of American Machine & Foundry Company, will exhibit for the first time, in Booth No. 2501, an automatic cut-off machine (illustrated herewith) designated as the Model ME-1 with automatic cut-off stroke. The automatic cut-off feature is said to provide a substantial increase in output over a previous model which was equipped with manual cut-off mechanism. The cutting mechanism of the new machine is totally enclosed in metal hood, ensuring complete operator protection. Clamps hold the material on both sides of the cut. The entire unit occupies only four square feet of floor space. The machine can be furnished in a 5-h.p. 1,800-r.p.m. model for the cutting of non-ferrous materials and in a 10-h.p. 3,600-r.p.m. model for ferrous materials. Both models are capable of cutting both round and extruded stock, as well as plastic and composition materials.

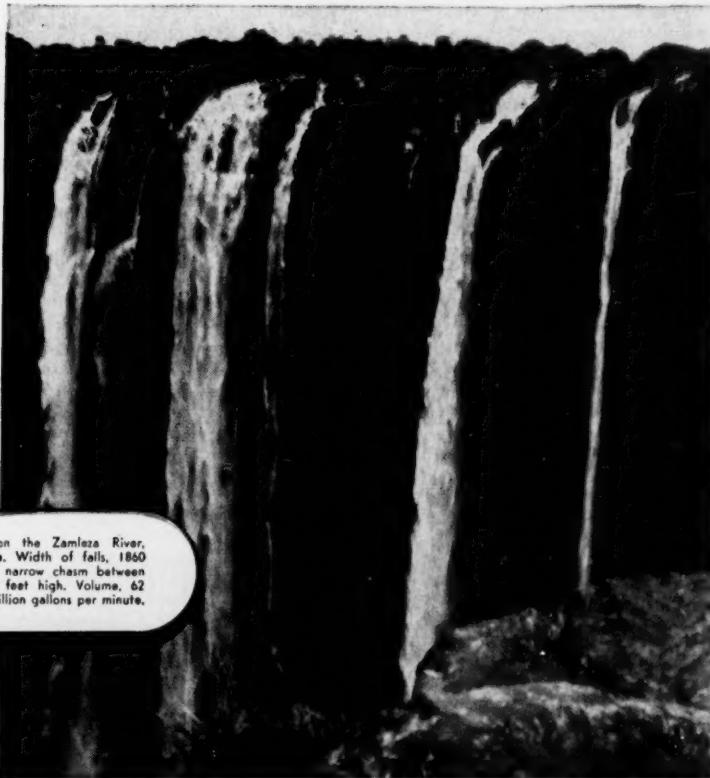
The company will also display other models of its metal-cutting machinery line, including the Model GWM, a 1½-h.p. 220/440-volt 3-phase 10-inch blade radial-arm metal cutter complete with a 2-inch wood over-top which converts the machine from woodworking to metal cutting operations; and the Model MGEV-1, a 7-1/20-h.p. 220/440-volt 3-phase radial-arm metal-cutting machine, complete with chain cross feed, "HHM" vises, and a steel over-top which can

be removed to convert the machine for wood-working operations. A Model ME-1 cut-off machine with manual cut-off will also be shown.

In Booth No. 112, The Carborundum Co., Niagara Falls, N. Y., will exhibit a number of diversified product lines, representing various divisions of the company. The Bonded Products and Grain Division will conduct actual grinding operations in demonstrating its Carboflex hot-pressed reinforced resin wheels which are said to possess high inherent strength and produce extremely rapid rates of stock removal. An improved line of MX grinding products will also be demonstrated. Used in a wide variety of grinding applications, these products are made of abrasive grain intermingled with cotton fibers and held together with an unusually strong organic bond. MX wheels in the finer grits and softer grades are designed for combined deburring and light polishing; coarse grit MX wheels are effective for weld grinding and heavy stock removal; and MX depressed-center wheels are recommended for grinding welds and for slotting and light cutting-off operations. Translite visual aids will be employed to illustrate the improved machinability and other benefits of using Ferrocabo in the production of quality steel and cast iron.

Also on display will be samples of the first zirconium and hafnium produced by The Carborundum Metals Co., Inc., Akron, N. Y., a subsidiary of The Carborundum Company. Specimens of zirconium and hafnium sponge, pure metal, zirconium tetrachloride, and zirconium carbonitride, useful intermediate products, will be available for examination. The Globar Division will also be represented with a pictorial presentation portraying the use of its heating elements in various types of heat-treating furnaces used in the metals industry and in sintering furnaces used in powder metallurgy. Qualified personnel will be in attendance to discuss the various products and their applications.

LOGAN FLUID POWER • DURABLE, DEPENDABLE SINCE 1916



Victoria Falls on the Zambezi River, Rhodesia, Africa. Width of falls, 1860 feet. Spills into narrow chasm between sheer walls 400 feet high. Volume, 62 million to 100 million gallons per minute.



LOGAN HYDRAULIC CONTROL VALVES

A broad range of types and sizes to most effectively meet any requirement—Design Engineers, Machine Operators, Maintenance Men appreciate these Logan advantages

- LONG-LIFE CONSTRUCTION
- EASY TO SERVICE
- INFREQUENT MAINTENANCE
- EASE OF INSTALLATION
- EFFORTLESS OPERATION
- UNRESTRICTED PORTING

Let Logan Engineers help you
design your Air and Hydraulic
Circuits

LOGAN MANUFACTURES 6,975 STANDARD CATALOGED ITEMS FREE CATALOG ON REQUEST



Illustrated, Model 8015 adjustable speed control valve. Install between operating cylinder and pump or cylinder for meter flow of oil in one direction with free flow on return.

AIR CONTROL VALVES, Cat. 100-4 - AIR CHUCKS, Cat. 70-1 - AIR CYLINDERS, Cat. 100-1 - AIR-HYDRAULIC CYLINDERS, Cat. 100-3
AIR and HYDRAULIC PRESSES, Cat. 51 - COLLET GRIP TUBE FITTINGS, Cat. 200-5 - HYDRAULIC CONTROL VALVES, Cat. 200-4
HYDRAULIC CYLINDERS, Cats. 200-2; 200-3 - HYDRAULIC POWER UNITS, Cat. 200-1 - SURE-FLOW COOLANT PUMPS, Cat. 42



ON EXHIBIT AT THE METAL SHOW

A wide selection of specialty metal strip, both solid and composite, will be displayed by the American Silver Co., Flushing 54, N. Y., in Booth No. 1305. Comprised of many metal specimens, both in coil and fabricated form, the exhibit will illustrate to materials engineers, design engineers, and purchasing men, the unique custom metal processing service now available to industry. Heading the display will be a valance fabricated of 1½-foot wide copper strip with mounted letters reading "Specialists in Metal Strip." A background will be formed by large colored and lux murals representing some of the company's special plant facilities, including two-high, four-high, and Sendzimir cluster precision rolling mills, close-tolerance slitting and shearing lines, and continuous controlled-atmosphere strip annealing furnaces.

Among the highlights of the display will be very close tolerance metals, thin gauges, foils, and clad metals produced in widths up to 8 inches, in thicknesses down to 0.0005 inch and held to tolerances as close as plus or minus 0.0001 inch. In addition to displays of standard strip metal items, such as beryllium copper alloys, stainless steels, carbon steels, and nickel-base alloys, the company's coil stock exhibit will feature many other metals, including titanium, tantalum, zirconium, and Invar. Also to be displayed will be a new line of thermostatic bi-metals; 14-karat gold overlay, a composite metal consisting of a thickness of 14-karat gold clad to a base of copper, brass, or bronze; and braze-clad, a comparatively new silver brazing material. In addition, the exhibit will include a table display of industrial products of all kinds fabricated with the company's very close tolerance or thin gauge metal strip, as well as a dramatic display illustrating the maintenance of very close tolerance in the metal strip. In continual operation will be a Pratt & Whitney Model 10A Magnetic Continuous Gage, and the metal under test will be 0.0041-inch No. 25 alloy beryllium copper as produced by American Silver.

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35/64	7.70	43/64	9.20	27/32	12.50
9/16	7.70	11/16	9.20	7/8	13.20
37/64	8.25	45/64	9.40	29/32	14.00
19/32	8.25	23/32	9.40	15/16	14.50
39/64	9.00	47/64	9.60	31/32	15.50
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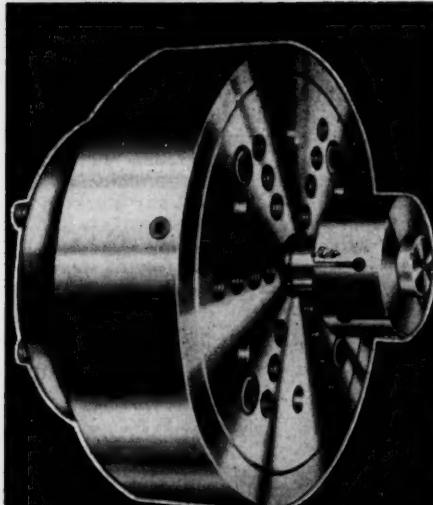
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ON EXHIBIT AT THE METAL SHOW

In Booth No. 941, Handy & Harman, New York, N. Y., will have an operating exhibit featuring Easy-Flo and Sil-Fos silver alloy brazing. The company will also show other silver products having growing industrial uses. There will be two main features forming the action part of the display. Of high interest will be a new production job. The hub of a pressed steel V-belt pulley will be brazed in place by a Easy-Flo brazing alloy and Handy Flux. An induction heating unit will be used. At another brazing station, torch heating will be used to demonstrate the versatility of silver alloy brazing. "Trimetal" will be shown joining cemented carbide tips to tool shanks. Four typical case histories of recent brazing jobs will be shown on one side of the booth background. The other side will be devoted to Handy & Harman Brazing Service which is nationwide. At a reception desk there will be displays of other Handy & Harman precious metal products now being used in increasing volume by industry.

To demonstrate that its aluminum strip has drawing qualities similar to those of its continuous-cast brass strip, Scovill Mfg. Co., Waterbury, Conn., will operate in Booth No. 1724 a unique press which will draw to similar dimensions cups from both aluminum and brass strips running side by side simultaneously. Pairs of these cups will be assembled for presentation to visitors at the Scovill exhibit as examples of the new aluminum strip's characteristics and industrial potentials. The cold-rolled aluminum strip will be marketed under the name of "Truspec." The production-line demonstration of the uniformity and soundness of Scovill's aluminum and brass strip mill products will also show the fabricating advantages offered by the company's extra long, non-welded coils of strip. Using 0.016-inch gauge strip approximately 1½ inches wide, the demonstration press at the exhibit will be fed from aluminum coils, each weighing up to 80 pounds per inch of width and containing 4,170 linear feet of material.



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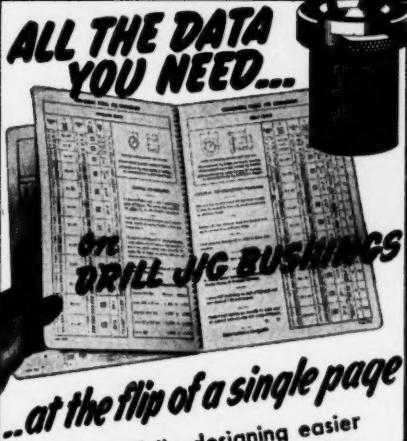
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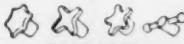
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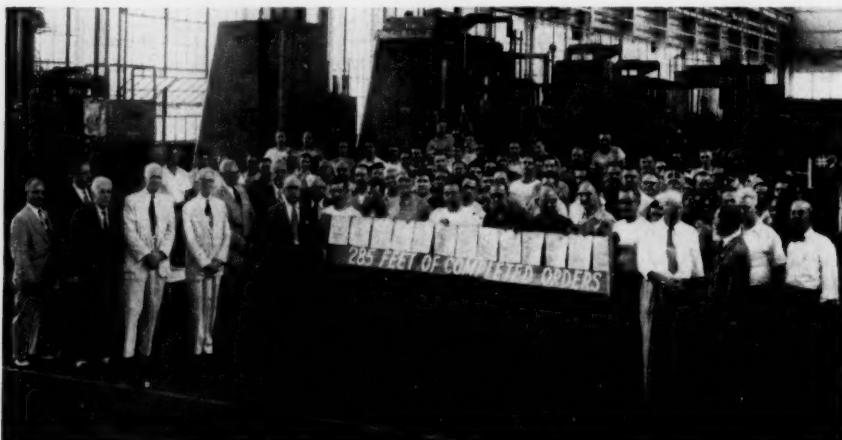
**200th Carload of Elephant Size
Machine Tools Recently Shipped
by Cincinnati Milling**

The 200th carload of elephant size machine tools, totalling 9,000 h.p. was recently shipped from the heavy shop addition to The Cincinnati Milling Machine Company's Plant No. 2 Cincinnati 9, Ohio. Starting with a new but empty addition which was dedicated in February, 1952, all the large machines were built and shipped within

the past 18 months. Members of the board of directors and officers of the company were present when Frederick V. Geier, president of the company, congratulated the employees on their achievement.

The heavy shop addition to the company's Plant No. 2 was constructed to meet the demand for the larger and more powerful types of special and single-purpose machine tools. The bay is served by two 50-ton cranes having

A scroll of completed orders for over 9,000 h.p. of elephant size machine tools is shown being presented to Frederick V. Geier (extreme right), president of The Cincinnati Milling Machine Company, by Ralph Haggerty, supervisor of large machine assembly.





Interior view of new addition to Tubular Micrometer Company plant, St. James, Minnesota

a lifting height of 28 feet. By utilizing both cranes, machines weighing up to 100 tons can be shipped without dismantling. Including the recent addition, total high bay assembling facilities are now 1½ miles long, served by traveling crane capacity of 775 tons.

Tubular Micrometer Now in Production in New Plant Addition

Announcement has been made by Howard James, president of Tubular Micrometer Co., St. James, Minn., that the company's new plant addition is now in production. The new Tubular Micrometer plant is of the most modern construction, with radiant heating, scientific lighting, and ventilation and provides ideal working conditions. It will eventually house many of Tumico's precision machining operations in its more than 14,000 square feet of space.

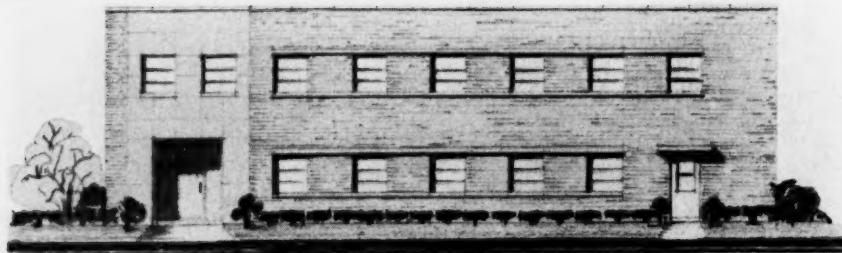
According to Mr. James, as the company attains full production with its new facilities in this additional space, it not only plans a substantial increase in volume on its present line of Tumico

precision measuring instruments but also intends to initiate the production of a number of new precision instruments of an allied nature.

N.M.T.B.A. to Occupy New Office Building

The construction of a two-story, yellow brick and stone, fireproof building to house the offices of the National Machine Tool Builders' Association has been announced by T. W. Grogan Co., Cleveland, Ohio. To be located on the east side of East 102nd Street between Euclid and Carnegie Avenues, the new building will be leased to the association on a long-term basis. The first floor of the building will house the association's statistical department, mailing room, and print shop. On the second floor will be located the executive offices, the board room, the accounting and stenographic departments, and the library. The building will contain 5,400 square feet of floor space and will be air conditioned throughout.

The association, whose members



Wash drawing of new office building to be occupied by National Machine Tool Builders' Association in Cleveland, Ohio

produce some 90 per cent of the nation's machine tool building output, was organized in Cincinnati in 1902, opened offices in Cincinnati in 1921, and moved to Cleveland in 1932. It has been located at its present office at 105th and Carnegie since 1936. New quarters are said to be necessitated by the expanded activities of the association.

Sixth Annual Conference on Machine Tools

The Sixth Annual Conference on Machine Tools, sponsored by the Subcommittee on Machine Tools of the American Institute of Electrical Engineers, will be held at the Cleveland Hotel, Cleveland, Ohio, October 14, 15, and 16, 1953. A series of eleven technical papers will be presented on a

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wide variety of subjects from "The Application of Calculating Machines to the Control of Machine Tools" to "Today's Machine Tools Need Modern Electrical Codes." Those attending will also have an opportunity to discuss their applications and mutual problems in connection with various standards, codes, and safety regulations applicable to the designing, building, and use of electrified machines. Plant tours are scheduled to Ford Motor Company, Engine Plant;

Warner & Swasey Company; Reliance Electric & Engineering Company; and Chevrolet Motor Company, Transmission Plant.

The banquet on October 14 will be addressed by Frederick S. Blackall, Jr., president, Taft-Peirce Manufacturing Company and president of the American Society of Mechanical Engineers. Mr. Blackall's subject will be "The Engineer's Obligation to a Free Society." L. B. Seltzer, editor of the Cleveland Press, will be the guest speaker at an informal luncheon to be held on October 15.

The A.I.E.E. Sub-Committee on Machine Tools is composed of electrical engineers representing the major machine tool builders, electrical manufacturers, and users of the country. R. H. Clark, administrative engineer, Warner & Swasey Co., Cleveland, Ohio, is general chairman; Kurt Tech, chief engineer, Cross Co., Detroit, Mich., is vice chairman; and V. R. Murphy, application engineer, Reliance Electric & Engineering Co., Cleveland, Ohio, is program chairman.

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New \$2,000,000 plant of The Cyril Bath Co., Solon, Ohio

Cyril Bath Company Opens New \$2,000,000 Plant

The Cyril Bath Company has announced the opening of its new \$2,000,000 plant located on Aurora Road in Solon, Ohio, about 20 miles southeast of Cleveland. Comprising 50,000 square feet, the new structure takes up only one-fourth of the 18 acres purchased by the company. Twelve acres of the site are being landscaped and some will be made into an employee recreational area. The new plant incorporates

ates many modern concepts of industrial architecture. Of one-floor construction, the building houses factory, general, and executive offices. The windows are horizontal, admitting daylight with a minimum of sun glare, and fluorescent lighting supplements natural lighting throughout the building.

The factory area has been laid out to facilitate an orderly flow of material and operations. Eight overhead rail cranes are designed to handle up to 25

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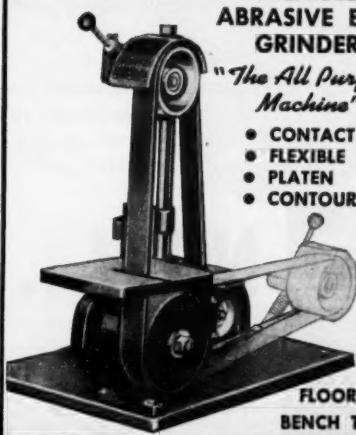
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ton loads. An outside storage area is similarly served by overhead rail crane, and a railroad spur runs directly into the plant. Heating is by hot water, and air conditioning is also provided.

Norton Honors Employees

Norton Co., Worcester 6, Mass., recently honored 907 long-time employees at traditional ceremonies which

date back to 1921. Thirty-three employees were awarded gold medals signifying 35 years of service with the company; 53 received gold watches for 25 years of service; 417 employees with company service between 26 and 34 years also received gold watches; 128 were presented silver pins for 15 years of service; and 276 were awarded bronze pins for 10 years of service with Norton. Milton P. Higgins,

Norton's president, was one of the new members added to the 25-year group.

Since 1921 when long-service awards were first presented, 1,459 employees have reached and passed the quarter century mark. The company now has 738 men and women actively employed who have worked in its Worcester abrasive and machine divisions for more than 25 years and an additional 369 people on the retired list. Of the remaining, 322 are deceased and 30 have left the company. At the present time, 3,607 Norton employees have been with the company longer than 10 years.

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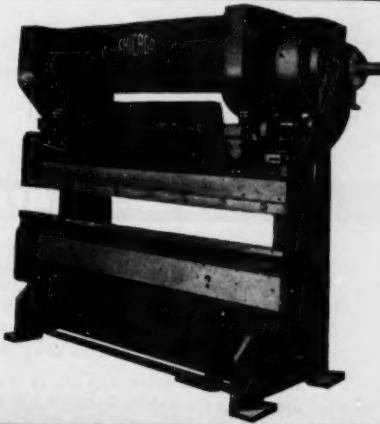


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Now plant of U. S. Diamond Wheel Co., Aurora, Illinois

U. S. Diamond Wheel Completes New Plant

United States Diamond Wheel Company has announced the completion of its new Aurora, Illinois, plant which is located at 835 Illinois Avenue. Constructed on a single-level plan, the modern, functional building is designed of structural brick and glass. The expansion, it is claimed, will enable the company to continue in advanced

research and development operations.

Devoted exclusively to the manufacture of diamond grinding wheels, the new plant is in full production, thus providing prompt deliveries on all requirements. The company's products are marketed through distributors in all principal cities. Frederick W. Lindblad, national chairman of the Diamond Wheel Manufacturers Committee of I. D. A. is president of the firm.

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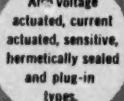
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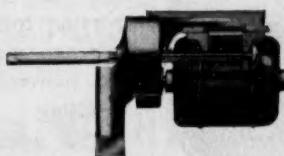


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A WORLD STANDARD FOR PRECISION

First-Built Savage Nibbler Still in Service

Recently, the W. J. Savage Co., Knoxville, Tenn., located in this city the first nibbling machine built in its plant. The machine was built in 1909 and has been giving service ever since that date. Savage brought the machine into its plant and, after resurfacing and replacing a few parts, it has been returned to service and is being used today.

Johnson's Wax Opens Metal-Working Lubricant School

A metal-working lubricant school to provide instruction in wax lubricants has been established by S. C. Johnson & Son, Inc., at the company's Racine, Wisconsin, headquarters. The school, believed to be the first of its kind in America, has been created to train salesmen of Johnson's distributors in the fundamentals of wax chemistry and in the use of Johnson's new wax cutting fluids and lubricants.

The current training program consists of a series of three-day courses under the direction and guidance of company lubricant engineers and technicians. Each course comprises a number of illustrated lectures in a specially-built classroom and laboratory demonstrations in the firm's Technical Service Department machine shop. The curriculum consists of lectures and demonstrations in the properties of wax and its use in metal forming, cutting, machining, piercing and blanking.

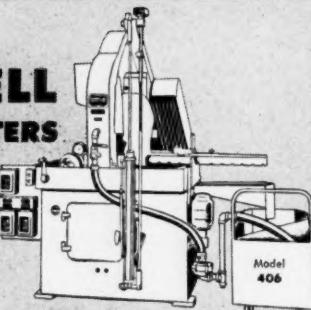
The school is conducted by



See These Machines—

CAMPBELL ABRASIVE CUTTERS

For fast, clean, accurate cutting of hard, soft, round, hex, square, or shaped stock

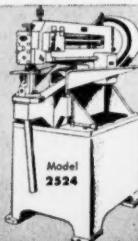


...at the National Metal Exposition

CLEVELAND
OCTOBER 19 TO 23 • BOOTH 1716
See the Campbell Cut-Off Machines and Nibblers in action!

CAMPBELL NIBBLERS

Cut odd shapes from ferrous or non-ferrous shapes



ACCO

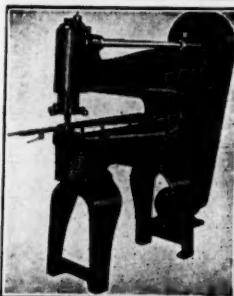


CAMPBELL MACHINE DIVISION
AMERICAN CHAIN & CABLE

931 Connecticut Ave., Bridgeport 2, Conn.

CAMPBELL
Abrasive Cutters
and
Nibblers

SAVAGE NIBBLING MACHINES



"NIBBLE YOUR COSTS"

FOR TUBE SLOTTING, TUBE SHAPING AND
FAST AND ACCURATE CUTTING OF FLAT
SHEETS BY TEMPLATE OR TO A SCRIBED LINE

W. J. SAVAGE COMPANY

Knoxville

Since 1885

Tennessee

PIONEER MFRS. OF NIBBLING MACHINES

CAPACITIES

UP TO
3/4"

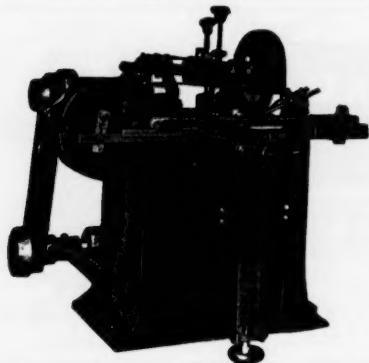
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GRANT RIVETERS



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THE GRANT MFG. & MACHINE CO.
96 Stillman Ave. Bridgeport 5, Conn.



Wardwell Model EC Combination Grinder
The only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the teeth. • This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

THE WARDWELL

**sharpening 1 gross
of hack saw blades
PAYS
for this machine!**

One gross of hack saw blades can be resharpened at least 6 times—actually saving you the price of the machine!

Wardwell EC Grinder gives old blades a keener, longer lasting cutting edge—because new blades are usually not ground after hardening.

Wardwell EC wheels will not burn, anneal or injure hardness of teeth. Sharpen Circular, Hack or Band Saw blades on one machine!

WRITE FOR BULLETIN EC TODAY

Complete Wardwell Catalog describing more than 30 grinding, sharpening, setting and swaging machines also available.

MANUFACTURING CO.
3166 Fulton Rd., Cleveland 9, Ohio



The advantages of Johnson's wax lubricants in a drawing operation are explained by George Boehm, wax lubricant sales engineer, during the second class at the new Johnson Wax Metal-Working Lubricant School in Racine, Wisconsin. Holding the metal radio case part is John Werner, sales engineer, one of the instructors.

George Boehm, technical sales engineer and merchandiser. Mr. Boehm is assisted by John Werner, sales engineer; J. P. Mullenix, technical service specialist; and Steve Horvath, technical service machinist.

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All Models Have
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that Won't Face
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Many New Features
Write Today for Complete Details

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COMBINED BORING & FACING TOOL HEADS

Chandler-Duplex



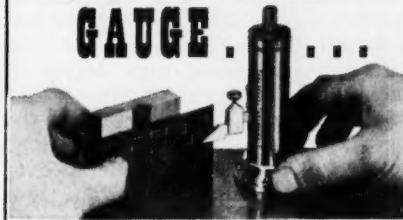
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**AUTO MOULDING
& MFG. CO.**

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MICRO-HEIGHT GAUGE



FOR FAST, ACCURATE LAYOUT

A new precision height gauge which reads like a micrometer and measures zero flush at base. Has a direct reading of 2" with scriber in upright position, and 3" with scriber reversed.

Replace scriber with dial indicator and Micro-Height Gauge measures center distances between holes or surfaces. As indispensable as a micrometer to toolmakers, layout men, and inspectors.

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"Stack Up"

THESE BOXES AGAINST ANY!

Once you use and compare Sterling stacking boxes, you'll know why we invite comparison in design, construction, and price. Our "Top Rim" construction provides stronger support all around the box . . . no corner inserts to become loose and fall out. Efficiency in designing and manufacturing allows us to quote favorably on any type or size stacking box.

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Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.



Sterling Bin Front "Top Rim"
Steel Stacking Box.
Size: 18" x 12" x 6".



Sterling "Top Rim" Steel Stack-
ing Box with drop handles.
Size: 18" x 12" x 6".



Sterling
Quality Handling & Storage Equipment

Improved Process for Producing Die-Cut Parts

Dayton Rogers Mfg. Co., Minneapolis 7, Minn., has announced an improved method of producing precision die-cut parts with a high degree of accuracy. The manufacturer states that with the improved method, the size and relative location of pierced holes can be held to a tolerance of plus or minus 0.001 inch. The pro-

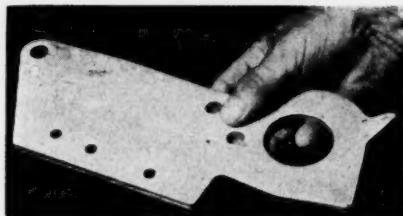


Illustration showing typical die-cut part produced with Dayton Rogers improved process

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STAY SHARP LONGER!

HERE'S WHY!

Forthman Scrapers are tipped with CARBOLOY CEMENTED CARBIDE—the hardest metal made by man. Holds keen cutting edge for hours instead of minutes of continuous use! Outwears as many as 10 ordinary steel scrapers! Provides finer finishes faster!

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Manufactured by
CLIFF J. FORTHMAN
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cess is said to be applicable to the die-producing of all sheet materials that can be stamped, such as all sheet and alloy steel and non-ferrous sheet materials, including fiber, Bakelite, and other sheet stock. Practically any gauge can be blanked and pierced to the desired shape and size from 0.001 up to $\frac{3}{8}$ -inch thick material.

Thor Builds New Plant in England

Production began recently at a newly constructed plant of Armstrong Whitworth & Company (Pneumatic Tools), Ltd., a subsidiary of Thor Power Tool Co., Aurora, Ill., at Tynemouth, England, following one of the largest industrial transfers in Tyneside's history when the entire former factory at Newcastle was transported over a 10-mile route to the new, enlarged plant on the Tyne. The new factory has 50 per cent more manufacturing

You Need an Extra Hand Now to Speed Up Production!

HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per-hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money too!

IN 11 SIZES—No. 6 to 1" N.C. in all S.A.E. sizes.

HEIMANN MFG., CO. • URBANA, OHIO

PRECISION PINS

Dowel — Straight
Countersunk — Taper
Made to Blueprint
CENTERLESS GROUND
TO $\pm .0001$ " ACCURACY
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Complete Centerless Service
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25,000,000 of
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automatically on
screw machines

NEW METHOD Automatic ROLL MARKER

Designed for use on automatic screw-machines, lathes, etc., the New Method Model 500-C marker with its quick-interchangeable roll dies is practically fool-proof, saves time and money.

For further information ask for Bulletin NM 500-C.

NEW METHOD STEEL STAMPS, Inc.
149 Joseph Campau, Detroit 7, U.S.A.



A *Big* HELP
IN MAKING SET-UPS

When you are making set-ups for tapping and reaming jobs, you will find the Ziegler Tool Holder a big help. This is because, with the Ziegler Holder, you do not have to take the time to make a set-up that is absolutely perfect. Just come within $1/32$ " of center on the radius ($1/16$ " of center on the diameter) and the holder will automatically correct the inaccuracy.

Get a Ziegler Holder and see how it will simplify the work of making set-ups. You'll find that it will pay for itself many times over in the course of a year.

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ROLLER
HOLDERS

FLOATING HOLDER
Taps and Reamers...

W. M. ZIEGLER TOOL CO.

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DETROIT 23, MICH.

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CATALOG •

space than the former plant and features modern equipment, facilities, and working conditions. The walls are pastel colored, and fluorescent lighting is used throughout to provide optimum light conditions. All machines are painted light green with bright red controls, and offices are acoustically treated to dampen factory noises.

R. J. Faverty, former Chicago and Detroit branch manager for Thor, is managing director of the English company.

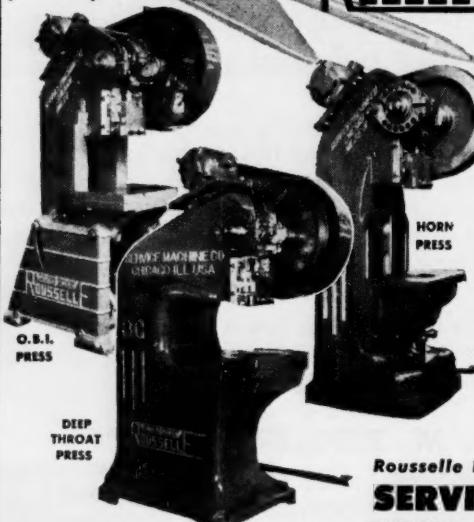
New Officers Elected By M. E. Cunningham

The board of directors of M. E. Cunningham Co., Pittsburgh manufacturer of steel stamps, dies, and marking devices, has announced the

election of the following officers: F. S. Speicher, Jr., president and treasurer; F. S. Speicher, Sr., vice president in charge of research and development; Walter J. Speicher, vice president in charge of sales and secretary; and William G. Kratz, vice president in charge of production. In addition, Edwin W. Speicher has been elected assistant vice president, Viola Stewart has been elected assistant secretary, and Leon C. Hauer has been appointed chief engineer in charge of product designing.

Previously, F. S. Speicher, Jr., was secretary and treasurer, while F. S. Speicher, Sr., served as president. Walter Speicher was formerly assistant treasurer, and William Kratz was shop superintendent. By increasing its administrative and management

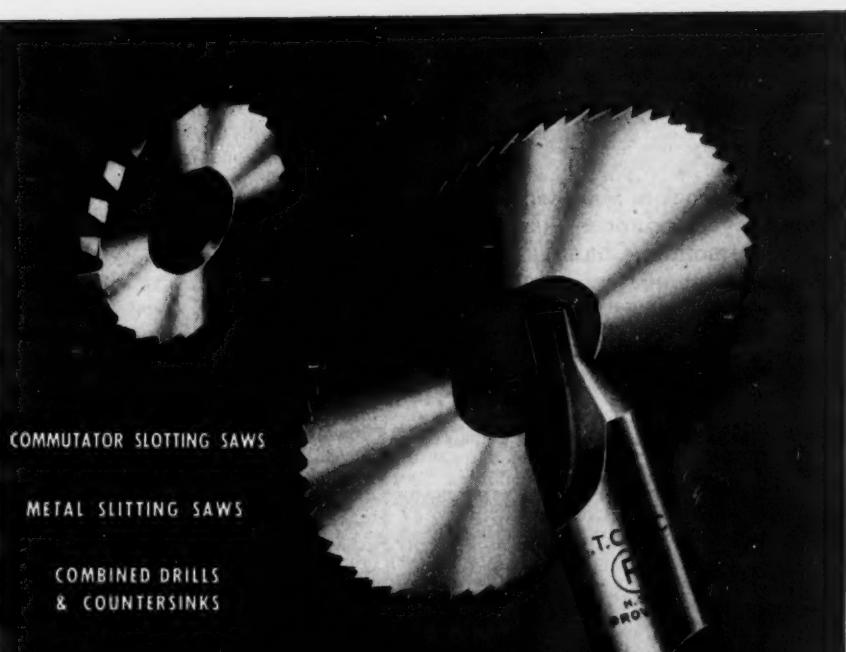
Men who had to "lick" the very problems you're facing designed... Rouselle **PRESS**



That's why they're fast, accurate, so adaptable, so easy to operate. Why maintenance is simple. Why initial cost is low . . . Often considerable savings and improved punch press operations are possible if you let our engineering staff assist you. There is no obligation. Simply furnish the details relating to your need or problem and if possible send samples or drawings of the work. You will hear from us promptly.

**Sold Exclusively Through
Leading Machinery Dealers**

**Rouselle Presses are Manufactured by
SERVICE MACHINE CO.**
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METAL SLITTING SAWS

COMBINED DRILLS
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Circle R tools are made in a wide range of standard sizes — and special sizes or designs will be made up promptly on your order. Write for details — or look us up in the phone book, and talk with our nearest representative.

Circle R tools are made in a wide range of standard sizes — and special sizes or designs will be made up promptly on your order. Write for details — or look us up in the phone book, and talk with our nearest representative.

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Philadelphia • Pittsburgh • Phoenix • Providence • Rochester • St. Louis • Cincinnati

METAL SLITTING SAWS
SCREW SLOTTING SAWS
COPPER SLITTING SAWS
COMMUTATOR SLOTTING SAWS
JEWELERS SLOTTING SAWS
TUBE CUT-OFF SAWS
SLITTING DISCS • SOLID &
TIPPED TUNGSTEN CARBIDE
SAWS • COMBINED DRILLS
COUNTERSINKS & CENTER
BURNERS



personnel, the company expects to be better able to handle its increasing volume of sales and enlarged production facilities.

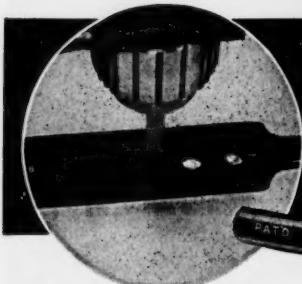
Standard Tool & Manufacturing Company Announces Plant and Personnel Changes

Kerr Volis, co-owner, and James Nick, general manager, Standard Tool

& Mfg. Company, Detroit, designer and manufacturer of special machine tools, have announced several changes and organizational expansions in the company.

Over two thousand square feet of floor space have been added to the assembly department, and George C. Steyskal has been appointed factory manager with the additional responsibility of heading up the new service department, recently established to assist Standard customers. David A. Tyo, Jr., newly appointed plant superintendent, will assist Mr. Steyskal,

Drill Hardened Steels without Annealing -



USE
The New
IMPROVED
"HARDSTEEL"
DRILL

With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

You Harden It—We'll Drill It—
With "HARDSTEEL"

BLACK DRILL COMPANY, INC.
1372 East 222nd St. • Cleveland 17, Ohio

Also makers of—
BLACK DRILLING
UNITS—AUTOMATIC,
SELF-CONTAINED—
FOR COST-CUTTING
PRODUCTION ON
ALL MATERIALS
Write for information



George C. Steyskal

whose duties will include engineering, estimating, job write-up, and service. Oscar M. Bates will continue as office manager and purchasing agent and August F. Markus of Markus Engineering Service will continue to act as Standard's chief engineer.

GILMORE DIAMOND TOOLS



NEEDLEPOINT DIAMONDS (PHONOPOLYNS)

SHARP, DURABLE, BEST QUALITY; DISCOUNTS IN QUANTITIES

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WALTHAM SUB-PRESSES

... for precision work



Exact alignment and constant precision can be maintained throughout life of die. Made in 9 sizes. Babbitt bearing is tapered on outside and can be forced downwards. This reduces inside diameter to fit plunger when latter becomes worn through use.

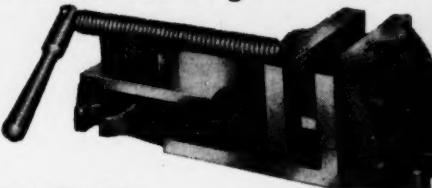


WALTHAM,
MASS.

Write for further information.

WALTHAM MACHINE WORKS

A Hundred Jigs In One

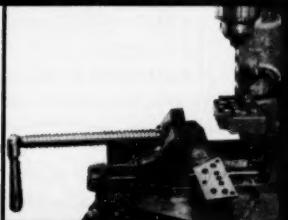


- ★ Quick action design — for speed.
- ★ Screw and nut hardened steel — for long life.
- ★ Heavy semi-steel castings — for strength.

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CARDINAL
MACHINE
COMPANY
1819 Dana Street
Glendale, Calif.

- ★ Heavy steel base plate — for rigidity.
- ★ Standardized holes in jaws — for attaching interchangeable jaw plates and fixtures.



Save Production

Tooling Costs

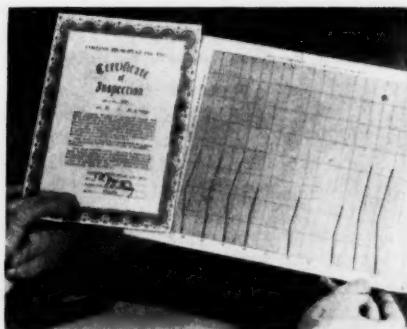
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SPEED VISE

Lift... Slide... Lock... that's all it takes with the fast-acting positive locking SPEED VISE. Drill jigs and other fixtures are simpler, cheaper and smaller when made for use in a SPEED VISE. Instead of a cumbersome and expensive box jig, with a SPEED VISE it is only necessary to make a simple jaw plate to fit the part being machined and to hold drill bushings, etc.

Certification of Surface Plate Accuracy

The degree of accuracy in a surface plate, being of utmost importance to inspectors of precision work, must be determined prior to the plate's use. Overall accuracies range from 0.001 inch down to as fine as 0.000005 inch, according to the specifications of the user. A manufacturer of black granite surface plates is now introducing a



Plotted diagram Certificate of Inspection used in conjunction with the auto-collimator in surface plate checking

DOES IT BETTER
DOES IT FASTER

SIMPLEX-M ABRASIVE BAND GRINDER



matic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.

333 Nassau Avenue, Brooklyn 22, N.Y.

certification of accuracy to accompany each plate. By the use of a British-made auto-collimator, optical readings are made of each plate required to meet extreme precision requirements. By the use of the auto-collimator, it is possible to detect surface variations as minute as 0.000004 inch per inch. A part of the Certificate includes a graph on which is plotted any deviations from true plane in millions of an inch in each position inspected. From this graph the technician using that particular surface plate knows exactly the plane accuracy in any part of the plate. A diagram of 3-point suspension positions is also a part of the Certificate.

Collins Microflat Co., 2326 E. 8th St., Los Angeles 21, Calif., is the ori-

HIGH SPEED or CARBIDE BORING TOOLS

FOR HOLES FROM
1/16" UPWARD
17 DIFFERENT SIZES

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COMET Tool Co.

For MASS PRODUCTION

- FAST PERFORMANCE
- ECONOMY IN PRODUCTION
- EFFICIENT IN RESULTS
- CONSTANT SHAPE OF CROSS SECTION
- LONG LIFE

Dealers! Here's
a Profit-Maker!

738-MM BROADWAY

• NEW YORK 3, N.Y.

October, 1953

OK

T-slot Bolts

The world's best . . . one-piece, drop forged—not welded—of mild carbon steel, heat-treated, with head accurately milled for standard tables on lathes, planers, boring mills, milling machines. Integral washer and nut. Sizes: up to 30". Typical direct prices for 10" lengths: 1/2"-\$1.36; 5/8"-\$1.36; 3/4"-\$1.58; 7/8"-\$1.89. Write for price list.

THE O K TOOL COMPANY, INC., MILFORD 4, N. H.

CAMS

We are fully equipped to GRIND OR MILL a complete range of CAMS to your specifications on our ROWBOTTOM Cam Milling Machines.

Your inquiries answered promptly.

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Micro Supreme

LAY-OUT AND IDENTIFICATION DYE

7 COLORS

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

MICHIGAN CHROME & CHEMICAL COMPANY
8615 Grinnell Ave. • Detroit 13, Mich.

SAVE

the expense
of special jigs, fixtures—
Save set-up time, too!

HART MILLING FIXTURES

"Masters of A Thousand Set-ups"

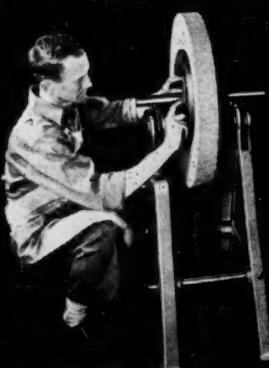
The inexpensive, versatile answer to many different set-up problems. Hart Fixtures hold round, hexagonal, octagonal or square stock aligned with the machine, on miller, shaper, drill press and tapper. Value proved for years in large and small shops; famous for key-way set-ups. Usually sold in pairs; four sizes, capacity $1\frac{1}{2}$ " to $4\frac{1}{2}$ ", can be used horizontally or vertically.

WRITE FOR ILLUSTRATED FOLDER

HART MILLING FIXTURES

WALTER W. FIELD & SON, INC.
39 Hayward St., Cambridge 42, Mass.

Balancing Tools for Small, Medium or Large Work



Sundstrand offers a complete line of balancing tools which will save their cost quickly on truing or balancing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. Standard swing sizes range from 21 inches up to any swing desired. Length between standards ranges from 20 inches to any length desired.



Checking balance
of lathe spindle

FREE DATA

You can obtain complete information on

Sundstrand Balancing Tools by writing for bulletin 537.



SUNDSTRAND MACHINE TOOL CO.
2539 Eleventh Street, Rockford, Ill., U.S.A.

ginator of the plotted diagram Certificate of Inspection used in conjunction with the auto-collimator in surface plate checking. A specimen copy of the Certificate showing this method used on all Microflat surface plate sizes ranging from 9 x 12 to 54 x 144 inches is available on request.

Lafayette Tool & Supply Moves to Florida

Lafayette Tool & Supply Company has recently moved from New York City to a new location at 3355 N. W. 27th Ave., Miami 42, Fla. Specializing in small cutting tools, precision tools, and special tools for the machine shop and production plants, the company erected a building and moved its stocks to Miami as a result of increasing demands from southern accounts. Lafayette represents approximately 500 well-known manufacturers in the United States and abroad and handles standard tools, as well as special and left-hand taps and dies, long drills, special reamers, cutters, end mills, and many other items, including production time-saving devices and light machinery.



HOWALD CARBIDE MILLING CUTTERS



PATENTED
END MILL

- **SQUARE BLADES**
Easily Replaced.
- Simple, Accurate
Blade Adjustment.
- Lowest Blade Cost.
- Cutters from 1½" to 14" dia.



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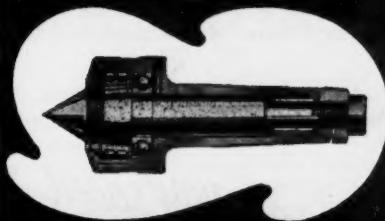
W. T. HOWALD

MACHINE WORKS

182 SIGOURNEY ST., BROOKLYN 31, N. Y.

NIELSEN

*Heavy Duty
Live Centers*



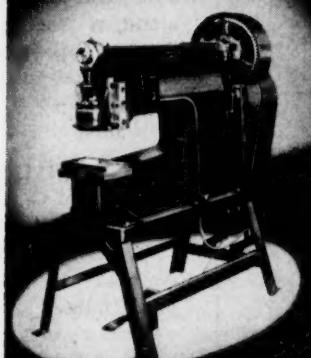
Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

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M on live centers

NIELSEN, INC. LAWTON, MICHIGAN

WHITNEY METAL

TOOL COMPANY
42 YEARS EXPERIENCE



WHITNEY-JENSEN No. 230—No. 231 DEEP THROAT POWER PUNCH PRESSES

These sturdy, deep-throated presses are widely acclaimed for their high speed and accurate production. Frames are welded steel; auxiliary attachments available; various punches and dies in stock for these two outstanding models.

Capacity: 20 tons

Throat Depths: 18" and 24"

WHITNEY METAL TOOL COMPANY
110 FORBES STREET, ROCKFORD, ILL.

Metal-Working News in Brief

Manufacturers' Industrial Supply Corp., Chicago, Ill., has announced the appointment of **Robert W. Lyng** as vice president in charge of sales. Mr. Lyng was formerly sales manager of The F. & D. Machine & Tool Works, Three Rivers, Massachusetts.

— o —

Muratet & Co., Tulsa, Okla., has been appointed representative in nor-

thern Oklahoma for Size Control Co., Chicago 12, Ill. Muratet & Company will handle Size Control's line of inspection gages and lapping machines.

— o —

Douglas M. Jones, formerly assistant chief engineer and technical consultant, has been appointed chief engineer of Axelson Mfg. Co., Division of Pressed Steel Car Co., Inc., Los Angeles, Calif. Mr. Jones succeeds **Glynn H. Williams** who has been advanced to

a special production engineering post with the company.

— o —

Firth Sterling, Inc., Pittsburgh 30, Pa., has announced the promotion of **Raymond J. Zale** to assistant to the sales manager, Steel Division. Mr. Zale, formerly a steel metallurgist will assume the responsibilities for the sale and promotion of tool steel products.

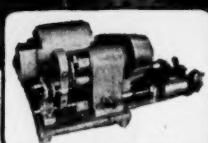
— o —

David J. Ryffel, formerly of G. M. Basford Advertising Agency in New York, has been named advertising manager of **Producto Machine Co.**, Bridgeport, Connecticut.



PINES END-FINISHING MACHINES

Handle broad range of rod, tube, and pipe end-finishing work with speed and precision. Exclusive chuck feature clamps and feeds work to cutters in one motion. Operator always has one hand free for stock handling. Designed with quick interchangeable tool holders and chuck inserts, 8-speed sheave — 760 to 3920 r.p.m., hardened and ground spindle, grease-sealed precision bearings. Automatic swing-type stock stop assures fast, accurate positioning. Entire unit is portable, takes up small space, handles stock diameters up to 2". Max. feed is 1 1/4". Larger sizes up to 5" capacity available. Typical production: 800 tube ends per hour.



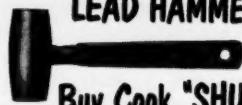
(Above) Pines 2" High Production End-Finishing Machine equipped with tool holder and air operating cylinder. Clamped, feed, and return cycle is automatic. Operator has both hands free for stock handling. Supplied similar to hand-operated unit.



Write for Free Bulletin
Write today for free bulletin and learn how these machines are built to save time on a wide range of work.



LEAD HAMMERS—



Buy Cook "SHUR-GRIP"

They're a MUST in every shop where many blows have to be struck without marring surfaces. Available with "SHUR-GRIP" drop forged handles.

Write for circular and prices

LAWRENCE H. COOK, INC.

67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

COMPLETE
LEAD HAMMER
SERVICE

JIG BORING

Done to your specifications

WE HAVE

12 JIG BORERS

Including the largest

PRATT & WHITNEY Made

BLOOMFIELD TOOL CORPORATION

17 FARRAND ST. BLOOMFIELD, N. J.



WHITNEY LEVER PUNCHES

SINCE 1908

Provide Powerful Capacity
For Every Requirement

- Expertly designed, quality built W. A. Whitney hand lever punches meet every test for long, efficient, trouble-free service. Every punch, from No. 4B for punching $\frac{1}{4}$ " hole through 16 gauge iron to the No. 94 for punching $\frac{1}{2}$ " hole through $\frac{1}{4}$ " stock, is built for hardest service. Guaranteed for highest quality material and workmanship.

Write for Lever Punch Catalog

W. A. WHITNEY MFG. CO.

640 RACE ST. ROCKFORD, ILL.

People work better when they SEE BETTER

3-D Girl at SKF

Magni-Focuser multiplies the power of this girl's eyes as she inspects a tiny ball bearing at SKF Industries, Inc.



MAGNI-FOCUSER's matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

Gives true third-dimensional ("3-D") vision

MAGNI-FOCUSER

S P E E D S P R O D U C T I O N
Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents. Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

EDROY PRODUCTS CO.

480 Lexington Ave.
Dept. P, New York 17, N. Y.

Metal-Working News in Brief

Theodore H. Booth, recently appointed general manager of the Bonded Products and Grain Division of The Carborundum Co., Niagara Falls, N. Y., has been elected vice president. Mr. Booth was assistant vice president of Walworth Company of New York in charge of manufacturing before coming of Carborundum in May 1952, at which time he became director of manufacturing in a staff capacity.

Norton Co., Worcester, Mass., has announced five appointments and one retirement among its outside sales personnel. **Stewart J. Bell**, abrasive engineer in the western Michigan area, has retired after almost 40 years of service with the company. **Allen C. Moore**, formerly of the Detroit office sales engineering department, has been named an abrasive engineer and will assume Mr. Bell's former duties. **Harlan W. Cobb**, office manager of the Cleveland office, has become a field

engineer, covering the area serviced by that branch. **Philip H. Threshie**, formerly a field engineer on the West Coast, has been appointed an abrasive engineer and will cover the area in and around San Diego and the entire state of Arizona. **Robert P. Cooper** and **Robert N. Hamilton**, have been named field engineers and assigned to the Los Angeles area.

— o —

Reid Brothers Co., Inc., Beverly, Mass., has announced the appointment of **The Satterlee Co.**, 118 Washington Ave., N., Minneapolis, Minn., as a dealer for the Reid Surface Grinder.



More and more leading band-saw machine manufacturers are standardizing on Carter Guides and Wheels for trouble-free operation.

•Write for Catalog

CARTER PRODUCTS COMPANY, INC.

426 Wm. Alden Smith Bldg. 30 Ionia Ave., S.W.
Grand Rapids 2, Michigan

DIRECTS A BEAM OF WHITE LIGHT ON YOUR CLOSE PRECISION WORK

Uneeda
LIGHT

Write for
Literature

Tool and Die Makers acclaim it for utility, getting into nooks or crevices hard to reach with ordinary light—for lining up punches in dies or working with the scribe in close places. Completely adjustable and portable. Light does not reflect back to your face. Ideal for inspectors seeking burrs, flaws, etc.

Price complete with 2 size bulbs \$13.75

TWENTIETH CENTURY
MANUFACTURING CO.

Box 429-M, Libertyville, Illinois

LUERS

PATENTED CUTTING OFF TOOL HOLDERS
PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips—MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

J. MILTON LUERS, 12 Pine Street, Mt. Clemens, Mich.

Produced under License Issued by John Milton Luers Patents Inc.

starting from scratch

WITH MARSHALL PRECISION GROUND FLAT STOCK



MARSHALL STEEL CO.
LA GRANGE, ILLINOIS

The Aristocrats of Ground Tool Steel

The world's largest range of sizes of precision ground tool steel in three grades are available, ready for immediate shipment and the layout bench.

★ **WATERcrat:** A fine grained electric furnace high carbon tool steel. It has been wet ground to remove all bad surfaces and to assure velvet finish of virgin metal.

★ **OLLcrat:** An outstanding product of careful handling assures you of a fine grained electric furnace oil hardening ground flat stock ready for the layout bench.

★ **AIRcrat:** This air-hardening tool steel shows less size change and offers a greater safety in hardening than either of the other grades. Box 108MM.

Write for descriptive literature, catalog of sizes and prices.

Metal-Working News in Brief

Raymond N. Gruber has been named director of marketing research at Standard Pressed Steel Co., Jenkintown, Pa. **Charles J. Betz** has been named to succeed Mr. Gruber as sales manager of the company's Unbrako line of socket screw products, dowel pins, and pressure plugs. **John W. Breitmayer** succeeds Mr. Betz as assistant sales manager of the line.

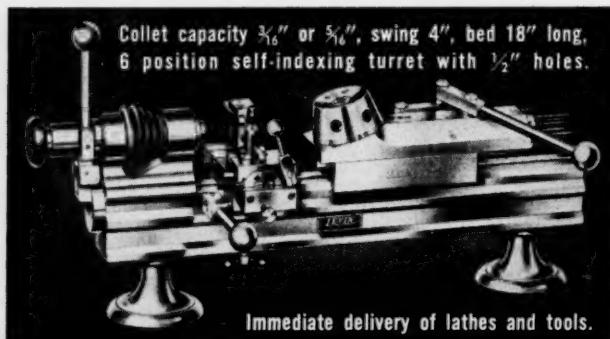
E. A. Kinsey Co., Inc., 16 Washington St., Dayton, Ohio; **James H. Cross Co.**, 2765 W. 8th St., Erie, Pa.; and **Harris Pump & Supply Co.**, Brady & Sidney Sts., Pittsburgh, Pa., are among the new stocking distributors named by Scully-Jones & Co., Chicago, Ill. The distributors will carry local stocks of Scully-Jones precision holding tools, enabling them to provide improved service to industries in their territories.

— o —

Induction Motors, Inc., has moved from 55-15 37th Ave., Woodside, N. Y., to a new and larger plant located at 570 Main St., Westbury, Long Island, N. Y. The new plant was built to afford maximum efficiency and speed in the production of precision-built motors.

— o —

Elmes Engineering Division of American Steel Foundries, Cincinnati, Ohio, has announced the appointment of **John E. Bush** as district representative of the Chicago territory, with headquarters at 410 N. Michigan Ave., Chicago 11, Illinois.



LEVIN ® Jewelers type lathes for fine instrument work and second operations. Collets as small as .004". Send for catalog. Louis Levin & Son, Inc., 782 E. Pico Blvd., Los Angeles 21.



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T-NUT & STUD SETS
STEP BLOCK SETS
PUNCH PRESS SETS

QUARTER TURN SCREWS
SHOULDER SCREWS
DOUBLE END JIG FEET
SCREW TYPE JIG FEET
PRESS TYPE JIG FEET
FLANGED NUTS
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ADJUSTABLE STEP BLOCKS
STAR TYPE HAND KNOBS
HEXAGON TYPE HAND KNOBS
KNULED HEAD SCREWS

Northwestern
119 HOLLIER AVE., DAYTON 3, OHIO

**CUT
TOOL
COSTS**

broken tools
made like new again
with **NU-TANGS**

Twisted or broken tangs replaced at low
costs on any tool with a Morse Taper (sizes 1 to 6).
Hundreds of leading industries save money on drills,
reamers, countersinks, cutters, drivers, the NU-TANG way.
Prompt delivery. Send for prices—or send tools for repair.
All work guaranteed.

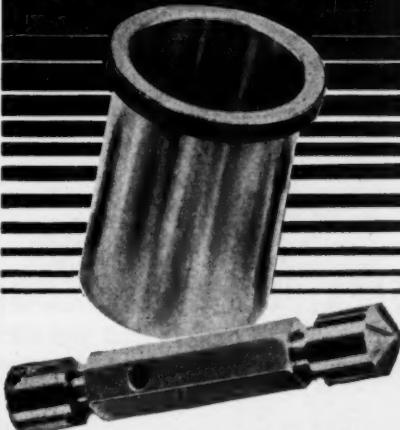
NO WELDING! **NO SLEEVES!**
NO SHORTENING! **NO DISTORTION!**

GUARANTEED *We return them
STRONG AS NEW!*

Send them to
us like this!

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Cincinnati 25, Ohio

**FOR ACCURACY
IN PRODUCTION**



**ECONOMY PRECISION
BUSHINGS AND GAGES
WORK HAND IN HAND**



- A.S.A. standard and special drill jig bushings,
- A.G.D. plug and ring gages, both new and chrome plate.
- Gages salvaged by hardchrome plating.

Write for bulletin and price list.



Clark
ADJUSTABLE
HOLE
CUTTER

MM-10

For complete information call your Clark
Cutter Jobber now or write Factory B
ROBERT H. CLARK COMPANY
9330 Santa Monica Blvd., Beverly Hills, Calif.

Manufacturers of Precision Cutting Tools

Economy
TOOL & MACHINE CO.

1827 S. 68TH ST., MILWAUKEE 14, WIS.

Metal-Working News in Brief

Terry, Inc., 1426 M St., N.W., Washington 5, D.C., has been appointed exclusive representative of B. C. Ames Co., Waltham, Mass., manufacturer of micrometer dial gages and micrometer dial indicators. Terry, Inc., will cover Washington, D.C.; the western part of Maryland, with the exception of Baltimore; Virginia; and the eastern section of West Virginia.

Beaver Tool Co., Royal Oak, Mich., has announced the appointment of the following organizations as its representatives in the areas described: **Barney Machinery Co.**, 506 Martin Bldg., Pittsburgh 12, Pa., southwestern Pennsylvania and West Virginia; **E. W. Brock Co.**, 5657 Montgomery Rd., Cincinnati 13, Ohio, southern Ohio and Kentucky; **Coast Tool Co.**, 6046 College Ave., Oakland 18, Calif., northern half of California; **A. S. Guile**, 1129 Xenia Ave., Dayton 10, Ohio, central Ohio; and **W. S. Murrian Co.**, 912 W. Clinch Ave., Knoxville, Tenn., central and eastern Tennessee and western North and South Carolina.

— o —

The election of **Robert L. Westbee** as vice president of Minnesota Mining & Mfg. Co., St. Paul 6, Minn., has been announced. He will head the company's newly-created electrical products division which includes the electrical insulation and sound recording tape division, the Irvington Varnish & Insulator Division, and the American Lava Corporation.

CMH Stay-Put FLEXIBLE METAL COOLANT HOSE holds its position



CMH Stay-Put Flexible Metal Coolant Hose maintains any adjusted position for conducting coolant to work in process. It is leakproof and can be bent to any desired position by light hand pressure. Furnished in standard lengths and with a choice of fittings. For full details, write for bulletin.



CHICAGO METAL HOSE DIV. FLEXONICS CORPORATION

1373 S. Third Avenue, Maywood, Illinois

Manufacturers of flexible metal hose and conduit, expansion joints, metallic bellows and assemblies of these components.

In Canada: Flexonics Corporation of Canada, Ltd., Brampton, Ontario

HANCHETT

for all metal cutting

Metal Saw Sharpeners

(Hot and Cold Saws)

For Automatic Grinding of Cold Metal Saws.

Rigid — Accurate — Fast.

Ball Bearing Mounted Head Slides.

Heavy Duty Construction Throughout.

For inserted tooth, segmental type, solid tooth circular saws made in three sizes —Models 1130, 1160, 1172.

Saw capacities 8 to 72 inches and larger.

Other Models—Hot and Cold Saws, No. 12 and No. 572 (all sizes).



Two Views of High and Low toothed Metal Cutting Saws

HANCHETT MANUFACTURING COMPANY

World's Largest Manufacturers of Shear Blade, Knife and Saw Grinding Machinery

MAIN OFFICE—Big Rapids, Michigan

WEST COAST—Portland 4, Oregon



HARTFORD TRIPLE ACTION

CUTTING and TUMBLING BARRELS

for better work in less time!



For uniform cutting down, wet or dry grinding, tumbling, pulverizing and mixing, the unique design of Hartford Triple Action Barrels saves time and money and produces better results. Hartford Barrels give a TRIPLE ACTION in tumbling the material, an "over and over, end to end, folding-in" motion combined, which quickly grinds off burrs, and finishes and smooths the general surface of any article in the load. These barrels are available in two sizes, large and small, and with both motor and belt drive. Hartford also makes steel burnishing balls scientifically correct in design and material for each specific job. Bulletin on request.

THE HARTFORD STEEL BALL CO.

HARTFORD 6, CONN.

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W. S. TURNER
445 NEW CENTER BLDG.

CHICAGO

VICTOR R. CLARK
605 W. WASHINGTON BLD

NEWARK, N. J.

GUARANTEE TRUST BLDG.
912 BROAD ST.

LOS ANGELES, CAL.

E. O. MALTBY CO. 1718 SOUTH FLOWER ST.
W. A. RODRIGUEZ, INC. 55 W. 42ND ST., NEW YORK

2H582

Metal-Working News in Brief

Horton Chuck, Division of The E. Horton & Son Co., Windsor Locks, Conn., has announced the appointment of **Fred G. Littlejohn** as manufacturers' representative in the southern California and adjacent areas. Mr. Littlejohn's headquarters are in Los Angeles.

— O —

Brown Engineering Co., Reading, Pa., has announced the recent death of its founder, **Ellis E. Brown**.

Kennametal Inc., Latrobe, Pa., has announced the appointment of **Robert P. Schwing** and **Edward R. Willerton** as representatives and **William H. Hiltebeitel** and **Samuel H. Jones** as service engineers in the Middle Atlantic district, with headquarters at 3701 N. Broad St., Philadelphia, Pa. **Louis Lekich** has been named service engineer in the central district branch with offices at 5531 Woodward Ave., Detroit, Mich., and **Richard W. Phelps** appointed engineer in the Milwaukee district, with headquarters at 744 N. Fourth St.

— O —

Crucible Steel Company of America has announced the appointment of **Richard J. Rand** as assistant manager of the Cincinnati, Ohio, branch sales office.

— O —

Leon P. Disinger has announced his resignation as vice president and general manager of The Buckeye Brass & Mfg. Co., Cleveland, Ohio. Starting with the firm in 1923, Mr. Disinger has held progressive executive positions as factory manager, sales engineer, sales manager, and, most recently, vice president and general manager.

FEDERAL Overhead Flywheel PRESSES

28 YEARS OF QUALITY CONSTRUCTION

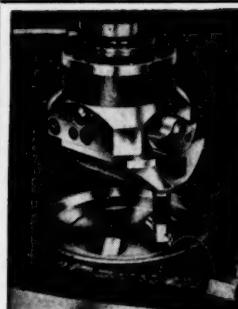


Don't let
light bulky
work tie-up
big-ton presses!

— Ram Area 24" x 8½"
— Shut Height 10"
— with 6" stroke
— Throat Depth 11½"
— Bed Area 21" x 33"

NO. 44
FLYWHEEL TYPE
35-ton Capacity

THE FEDERAL PRESS COMPANY
504 Division Street, Elkhart, Indiana



**ONE
Tool
ONE
Set Up**

...for boring,
facing, turn-
ing, recessing,
undercutting.

MASTERHEAD

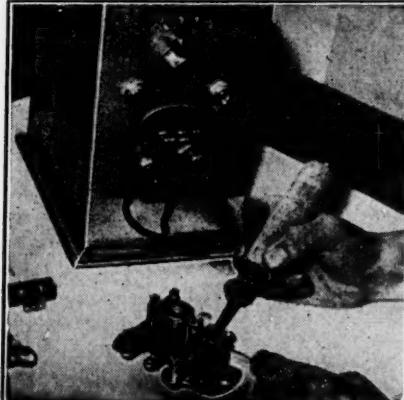
THE BORING HEAD THAT THINKS FOR ITSELF

Featuring: automatic feeds, end release and return; adjustable stop; adaptable to all standard machines; highest precision; ideal for jig borers; nine models for work up to 36 $\frac{1}{4}$ " diameter.

Send for Illustrated Literature

KARL A. NEISE

404 4th Ave., Dept. MMS, New York 16, N.Y.



FOR FASTER, SAFER SOLDERING

The Luma resistance method of soldering is the accepted way for small shops requiring single operation to large plants with many types of operations. Write for complete information about this remarkable tool.

LUMA ELECTRIC EQUIPMENT CO.
P. O. Box 132-M.S. Toledo 1, Ohio

Economy ELEVATING Table



ELEVATING TABLE EXTENDED

For feeding sheet stock, supporting fabricated frames, handling heavy dies, or as a portable work bench. All four sides are accessible to the user.

Lifting and lowering load is hand operated. Crank handle can be attached and operated from either end, with two speed lifting. Self locking worm and screw elevating mechanism holds work at any height without danger of falling. A foot operated floor lock holds table stationary when in use.

Capacity of 2,000 lbs. Dimensions — top 24" x 36", min. height 24", max. height 42".

PRICE F.O.B. CHICAGO . . \$210.80

**ECONOMY
ENGINEERING CO.**
4507 W. Lake St., Chicago 24, Ill.

Metal-Working News in Brief

J. H. Matthews has been appointed executive vice president of Raybestos-Manhattan, Inc, Passaic, N. J. Mr. Matthews has been associated with the company since 1914 when he joined The Manhattan Rubber Manufacturing Company.

Ready Tool Co., Bridgeport, Conn., has announced the appointment of **Machinists' Tool & Supply Co.**, 3690 Santa Fe Ave., Los Angeles 58, Calif., as exclusive distributors of its "Red-E" line of centers and dogs in the Los Angeles and southern California areas. **Robert A. Donavan** is president of the firm.

A GOOD NAME ON A GOOD PRODUCT

IS YOUR BEST

Salesman

HERE'S HOW YOU CAN MARK
YOUR PRODUCT BETTER . . .

with *Parker*
MARKING TOOLS

To stamp your name or trademark cleanly, permanently—and do it in less time, at less cost with a Parker hand stamp or press marking tool—is profitable, sound business. Trademarks and legends can be exactly duplicated, enlarged or reduced from your drawings by Parker craftsmen. To make a lasting impression—to sell more products to more prospects—be sure to specify Parker steel marking tools.

34 PAGE CATALOG 'Marking Tools by Parker' sent on request!



— o —

Maurey Mfg. Corp., Chicago, Ill., has announced the appointment of **Joseph E. Maurey** as vice president and general manager. **Russell B. Malloy**, formerly district sales manager covering Indiana, Illinois, and part of Michigan, has been appointed national sales and export manager.

— o —

Whitfield J. Bell, Norton Company abrasive engineer in Maryland and Delaware, has retired after 38 years service with the company. Mr. Bell has been succeeded by **David H. Paul**, formerly a field engineer in the district served by the Philadelphia warehouse.

SCHERR MAGNI-RAY

The Illuminated MAGNIFIER for PRECISION INSPECTION

Oblique rays make scratches and defects stand out clearly. Genuine optical glass lenses. Heavy adjustable base. Removable lens housing for inspection of large surfaces, engines, etc. . .

WRITE FOR ILLUSTRATED FOLDER

GEORGE SCHERR CO., Inc.

200-MM LAFAYETTE STREET • N. Y. 12, N. Y.



WADE ENVELOPES

protect
Shop Orders, Drawings,
Blueprints, Etc.

Two styles. No. 2 with fibre back, No. 3 transparent both sides. Non-inflammable acetate windows. Special style or size to order.

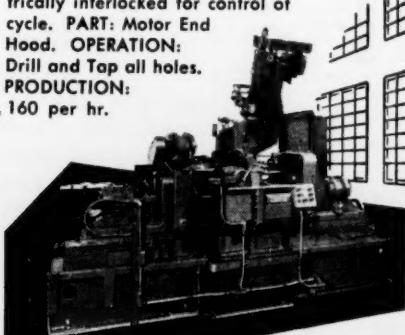
Write for details.

WADE INSTRUMENT COMPANY

Dept. M, R.F.D. No. 1,

Chardon, Ohio

No. S.O. 3787—4-Way Hydraulic Drilling and Tapping Machine equipped with two 10-H.P. Way Type Drilling Units and two 2-H.P. Drill Units. It has a 4-Station trunnion type index fixture with hydraulic actuation. Units are electrically interlocked for control of cycle. PART: Motor End Hood. OPERATION: Drill and Tap all holes. PRODUCTION: 160 per hr.



STANDARD MACHINE AND
TOOL CO., LTD.
WINDSOR, ONT.

U.S.A. Sales
Representative,
Arnold J. Werner Co.

New Center Bldg., Detroit 2, Michigan

Speed Assemblies
WITH
GILLEN GROOVE PINS
WITHOUT
Threading, Tapering, Reaming



TYPE "A"



TYPE "B"



TYPE "C"



TYPE "D"



TYPE "E"

GILLEN GROOVE PINS

Cut Fastening Costs—Save Time

Simple, Fast, Sure! Just drill the hole, insert the pin. Three longitudinal grooves expand the pin. It re-forms to shape of hole when inserted. GILLEN GROOVE PINS hold tight; yet they remove without damage to holes. GILLEN PINS improve assembled appearance. Millions are used by industry to do a better job at lower cost. Investigate GILLEN GROOVE PINS for your production line.

Here's How Easy GILLEN
GROOVE PINS Do It:



Put 'em together...FAST

Speed assembly time uniting fixed or movable members. Five types of GILLEN PINS meet nearly every fastening requirement.

Keep 'em together...SECURE

GILLEN GROOVE PINS fit tight at every point of hole circumference, making safe, positive anchorage, not affected by vibration or shock.

Take 'em apart...EASY

For replacement or repair, simply tap out the GILLEN PIN; re-use it. B-1112 and C-1010 zinc plated steel used. Also available in other metals, or plated to specifications.

Start Saving Now...

Get them from GILLEN—SEND THIS COUPON
JOHN GILLEN COMPANY INC., CICERO 50, ILL.

Send sizes and prices on Gilen Groove Pins

Name _____

Company _____

City _____

State _____

Attach this to your letterhead

TRY FREE SAMPLE PINS

Specify Appx. Diam. and Length Wanted

2542 S. 50th Ave., Cicero 50, Ill.

Metal-Working News in Brief

The Export Division of Simmons Machine Tool Corp., 50 E. 42nd St., New York City, has been appointed exclusive export sales agency for Ace-Central States Machine Tool Co., Detroit, Mich. Ace-Central designs, builds, and installs complete manufacturing units, including automatic and automation equipment, large jigs, fixtures, and supporting tools.

Van Norman Co., Springfield, Mass., has announced four promotions involving four present members of the management group. Vice President Roger L. Pyne, who has been in charge of all activities within the machine tool division, will henceforth concentrate on the engineering phases of that field. Herbert L. Freer, production planning manager, has been named general sales manager in the machine tool division. Edward C. Hellyer, production planning superintendent, has been appointed production planning manager, and George A. Raiche, public relations director, has been promoted to advertising manager, a position he will hold in addition to his present work.

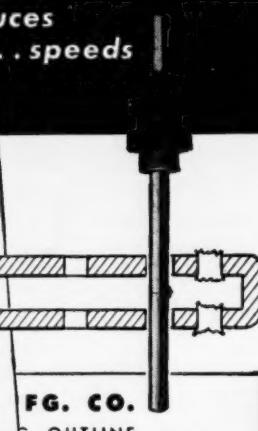
Deburring with NOBUR tool

on drill press reduces production costs... speeds deliveries!

MEMO

TO: Planning Dept.
FROM: Methods Engineer
NOTE: 75% saving in time on Op. #4 and 16% in overall time.

Let's take fuller advantage of
NOBUR



OPER. NO.	MACHINE	DESCRIPTION	TIME
1	TURRET	BORE 5 FACE PER PRINT	5 MIN
2	MILL	STRADDLE MILL PER PRINT	3
3	DRILL	10 HOLES LINE DRILL	6
4	BENCH	DE-BURR HOLES	4
4 (REV.)	NOBUR TOOL IN DRILL PRESS	NOBUR HOLES	1 =
		TOTAL	16 15

For further information, write or wire today

NOBUR MANUFACTURING COMPANY

212 NORTH VICTORY BLVD. • BURBANK, CALIFORNIA

Adamas Carbide Corp., Harrison, N. J., has announced the appointment of Tool Specialists, Inc., 891 Prospect Ave., Westbury, Long Island, N. Y., as its sales representative for northern New Jersey. Tool Specialists, Inc., will maintain a branch office at 694 Bruce St., Ridgefield, N. J.

READING BENCH KEYSEATER

Portable—move directly to job; a time saver for both small and large shops.

3 1/4" stroke; adaptable for other work.

Low first cost—prompt delivery.

Good dealers wanted.

READING MACHINE CO.
CINCINNATI 37, OHIO



Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive—Last for years.



Write for Circular
**NIELSEN TOOL &
DIE COMPANY**
P. O. Box 1067
Berkley, Mich.

RECLINABLE POWER PRESSES



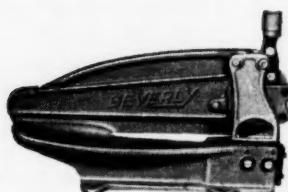
Ideal for general stamping work... 4 to 100 tons capacity. Can recline to 40° with perfect safety.

Our catalog contains a wide variety of press types and sizes. Write for it today.

***49th** year serving worldwide industry with Patent Percussion, Open Back, Double Crank, Punch, Horn, Toggle and Straight Side Presses, Dial and Roll Feeds.

ZEH & HAHNEMANN CO.
190 VANDERPOOL ST. NEWARK 5, N. J.

Save Time... Labor... Materials with



Inside SLOTTER

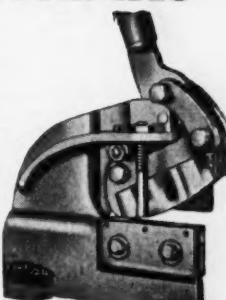
Make cuts up to 8" inside edge of sheet. Sharp, clean burr-free cuts always assured. Cap. 16 ga. High strength aluminum alloy body; H.C.H.C. blades.



Throatless SHEAR

Make any cut—straight, irregular, curved. Exclusive design permits turning work any direction while cutting. 4 models—cap. to 3/16".

BEVERLY metal cutting SHEARS



Slitting SHEAR

New "SS" Series—easier cutting with compounded linkage. 3 models—cap. to 3/16"; trimming capacity to 5/16" mild.

See your Beverly Distributor.
Write for FREE Illustrated
Bulletin.

Beverly SHEAR MFG. CO.

3000 W. 111th STREET • CHICAGO 43, ILLINOIS

Metal-Working News in Brief

Kempsmith Machine Co., Milwaukee, Wis., has announced the appointment of **Theodore F. Eserkalm** as chief engineer. In his new position, Mr. Eserkalm will direct an accelerated program of engineering developments.

— o —

Donald H. Montgomery, vice president and director of The New Britain Machine Co., New Britain, Conn., died

recently at his home in Farmington, Connecticut, after a short illness. Mr. Montgomery was one of the founders of the Gridley Machine Company which was absorbed by The New Britain Machine Company in 1936.

— o —

Pivot Punch & Die Corp., North Tonawanda, N. Y., has announced the promotion of **Edmund J. Klonowski** to general sales manager of all divisions of the corporation, and the appointment of **Frederick J. Rueger** to the position of director of cost planning for all divisions. Mr. Klonowski was formerly sales manager of the punch division.

— o —

Procurier Safety Chuck Co., Chicago, Ill., manufacturer of tapping heads, collets, and tapping machines, has organized a complete export program under the direction of **Robert E. Oscar**, export manager. Mr. Oscar is a well-known Chicago export manager, representing a number of principals in the specialized transportation and light machinery fields.

LIGHTS THE VITAL SEEING ZONE

The finest of All Localized Lighting Units

UL UL LISTED
TESTED AND APPROVED
BY UL TEST LABORATORIES INC.

FOSTORIA LOCALITES

MODEL 099-PX-412

Overall length 35 1/2". Three instantly adjustable joints.

- All Wire Fully Enclosed—completely protected from wear or insulation damage from oil and fumes
- Adjusta-tension Joints—tension easily adjusted for freedom of arm movement to suit worker and job
- Universal Base—mounts on outlet box or directly on machine or bench. Toggle switch included
- Reflector accommodates 100 watt or any A-19 or A-21 medium base screw lamp
- Baked Enamel Finish—Exterior, Vista Green—Reflector Interior, high temperature White

Nearly a Million Now in Use

fostoria
for Light ON the Job

Reg. U. S. Pat. Off.

Specially designed for machine tools, assembly and inspection benches

\$13.28 EACH
in package of 6
Single Units
\$16.60 Each

Write for complete catalog of Localite models with various type reflectors, arms and bases for every industrial use.

THE FOSTORIA PRESSED STEEL CORPORATION
FOSTORIA, OHIO
Localites available through wholesalers everywhere

MICROFLAT

COLLINS

BLACK GRANITE SURFACE PLATES

Present an absolute continuous bearing surface, finished up to 50 millionths inch. Incredibly smooth. Falling objects do not cause humps. Being harder than

hardened steel, can take greatest mis-treatment without causing inaccuracy of surface. No oiling. Will not rust or warp. No re-scraping. Most durable.

COLLINS MICROFLAT CO., 2326 E. 8TH ST., LOS ANGELES 21, CALIF.

PERFECT PRECISION

Avoid substitutes

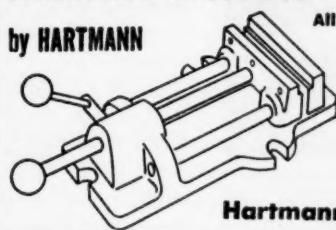
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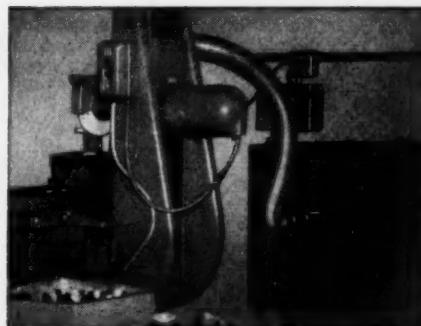
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Metal-Working News in Brief

Five experienced production engineers have been appointed to represent the recently-formed Shear-Speed Chemical Products Division of Michigan Tool Co., Detroit, in midwest and east areas. The new representatives and their areas are: **R. W. Glahn**, 213 Meadow Rd., Syracuse 4, N. Y., covering central New York State; **L. D. Supply Co.**, 117 W. Latimer St., Tulsa, Okla., and 436 Maple St., Wichita,

Kans., covering Kansas and Oklahoma; **E. J. Maddock**, 207 Investment Bldg., 239 Fourth Ave., Pittsburgh 22, Pa., covering western Maryland and adjacent Ohio counties, western Pennsylvania, and northern West Virginia; **T. S. Mellen**, 601 Tower Bldg., South Bend 1, Ind., covering northern Indiana and adjacent Michigan counties; and **Pierce & Rodman**, 640 Penton Bldg., Cleveland 13, Ohio, covering northeastern Ohio.

— o —

Drill Holes within .001" Accuracy with the Master Optical CENTER LOCATOR



Speediest—Simplest—most accurate method of locating centers and drilling holes. For a decade, machinists have been drilling and spacing holes with the Center-Locator to within .001". Just the thing for drilling round holes in thin material . . . avoiding drill run-outs . . . counter-boring holes with an ordinary drill. Makes your drill press do the work of a jig boring machine!

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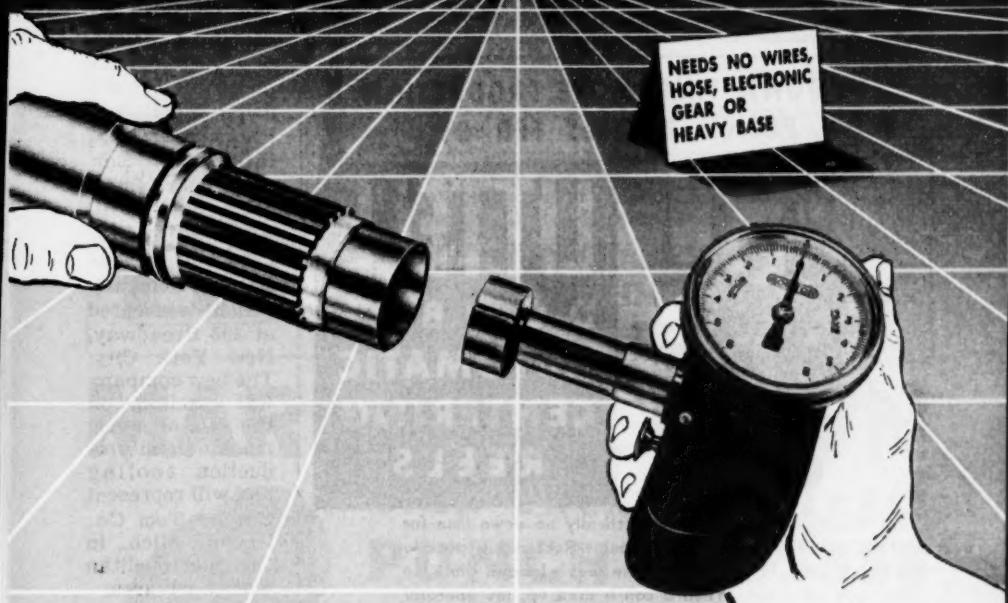
3725 Monitor Avenue
Minneapolis 16, Minnesota

Robert M. Barnum has been appointed sales engineer for the Butterfield Division, Union Twist Drill Co., Derby Line, Vt. Formerly associated with Bond Supply Company, Mr. Barnum will now represent the Butterfield Division in the southern Michigan territory with headquarters in Detroit.

— o —

Eugene J. Lenar, formerly with Western Michigan Steel Foundry, Muskegon, Mich., has joined the Carboloy Department of General Electric Company as an engineer at the Edmore, Mich., plant.

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St. Louis 1, Missouri Tulsa, Oklahoma Dallas 10, Texas Dallas 10, Texas
Berkeley, California 4194 Woodlawn Road
Corporation 25, Dallas
Toronto, Ontario, Canada
Los Angeles 22, California

Engineering Sales Company, 112 Pythian St., Houston Tex. — 1905 South Harwood, Dallas Tex.

Metal-Working News in Brief

Simmons Machine & Tool Corp., Albany, N. Y., has announced the appointment of **Clare Perlin & Associates**, 107 Columbia Ave., Park Ridge, Ill., as its midwest representative, covering the states of Wisconsin, Illinois, and Indiana. Mr. Perlin was formerly sales manager and advertising director of Kling Brothers Engineering Works, Chicago, Illinois.

Charles C. Reiff, chief engineer of Rockwell Manufacturing Company's Barberton, Ohio, plant, has been promoted to chief engineer of the company's Delta Power Tool Division at Bellefontaine, Ohio. Mr. Reiff joined Rockwell in 1950 in the position of design engineer.

— 0 —

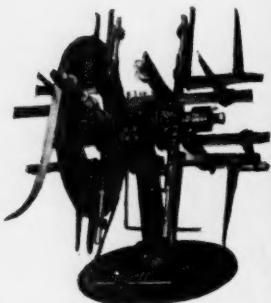
Oliver J. Green, formerly New York branch manager for Boyar-Schultz Corporation and cutting tool sales engineer for Brown & Sharpe Manufacturing Company, and **Robert Parks**, representative of the Empire Tool Company, have announced the formation of Parks & Green Company which is located at 396 Broadway, New York City.

The new company will specialize in the sale of screw machine and production tooling and will represent Empire Tool Co., Detroit, Mich., in the metropolitan New York area.

— 0 —

Landis Tool Co., Waynesboro, Pa., has appointed **A. J. Jones** as chief engineer. Mr. Jones, who prior to his appointment was in charge of sales engineering, has been with Landis for 17 years, having started as a college trainee with the company.

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LITTELL DOUBLE AUTOMATIC CENTERING REELS

Vital minutes are saved, with practically no down time for coil replacement, when a Littell Double Reel uncoils stock to the punch press. The idle side of the reel is loaded while the other side pays out. When a coil is used up, the operator simply lifts the hub lock pin, then swivels the reel 180°, thus placing the reserve coil in press feeding position. The change-over is complete in a few seconds. Like Littell Single Reels, Littell Double Reels combine balance that means smooth running accuracy with rugged malleable iron and steel construction that assures year in, year out dependability.

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A SPECIALIZED CAM MILLING SERVICE...
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Variable Speed Pulleys provide a most efficient and inexpensive speed control for all types of machinery. A patented feature of Hi-Lo Pulleys is the cam action within the pulley which automatically regulates belt tension actually required to carry the load. Hi-Lo Pulleys maintain constant speed at any speed setting. Hi-Lo Pulleys use standard V belts, obtainable at any supply house.

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- Easy to maintain — economical to operate.
- 5 to 70 tons capacity.
- 9 models.

MARSHALLTOWN MFG. CO.
MARSHALLTOWN, IOWA

Metal-Working News in Brief

A. Albert Klein, assistant director of research and development at Norton Co., Worcester, Mass., died recently at the age of 64. Mr. Klein was associated with Norton for 37 years.

— o —

The Sterling Abrasives Division of The Cleveland Quarries Co., Tiffin, Ohio, has announced the appointment

of **Philip de Veau** as sales engineer for the State of Wisconsin. Mr. de Veau was previously employed as manufacturer's agent for M. B. Austin Company.

— o —

The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, has announced the appointment of **Dean M. Cochran** as assistant sales manager. In addition to administrative sales activities,

Mr. Cochran has also been named manager of the metal - working and process press sales division of the company.

— o —

Farrel - Birmingham Co., Inc., Ansonia, Conn., has announced the transfer of **Franklin R. Hoadley, Jr.**, sales engineer, from the main office at Ansonia to the company's branch office at Akron, Ohio. Mr. Hoadley joined the firm in 1945.

— o —

Whitney Chain Co., Hartford, Conn., has announced the appointment of **James E. Gathings** and **Jon Chiesl** as power transmission and conveying chain sales engineers for the Dallas and Chicago district offices, respectively.

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IDEAL Electric ETCHERS

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BELLWOOD, ILLINOIS

Metal-Working News in Brief

Announcement has been made by the Detroit Broach Co., Rochester, Mich., of the election of **E. H. H. Graf** as vice president in charge of sales. Mr. Graf, who joined the company as sales manager early this year, has been associated with the broaching industry for many years, fourteen of which were as Detroit representative of the Oilgear Co., Milwaukee, Wis.

Edmund H. Gagnon and Everett M. Story have been named district office managers by Norton Co., Worcester, Mass. Mr. Gagnon will assume the duties at the Cleveland warehouse and sales office, and Mr. Story will take over the duties of office manager at Hartford, Connecticut.

— o —

Lipe-Rollway Corp., Syracuse, N. Y., has announced the appointment of **C. B. Spase** as chief engineer of automotive development, responsible for all automotive research. **Robert S. Root**, assistant chief engineer, will succeed Mr. Spase as chief engineer, Clutch Division, assuming responsibility for present and future heavy-duty clutch development, as well as customer engineering relations.

— o —

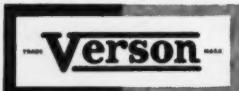
ELIMINATE TIME CONSUMING Hand Separation of Sheet Steel



with the **VERSON SHEET FLOATER**

By magnetic action, the Verson Sheet Floater ends the problems of hand separation in the feeding of sheet steel to presses, brakes and shears. Sheets formerly difficult to get ahold of are quickly and easily separated by the Sheet Floater—ready for the workers' grasp. Available in two models—Standard and Heavy Duty. Either model will handle rectangular, round or irregular shaped pieces. Write today for further information and prices.

A Verson Press for every job from 60 tons up.



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**VERSON ALLSTEEL
PRESS CO.**

Se. Lamer at Ledbetter Dr., Dallas, Tex.

Charles W. Kapplinger, formerly a metallurgical and research engineer with American Ski Co., Clare, Mich., has joined the Carboloy Department of General Electric Company as an engineer in the metallurgical process and quality control for permanent magnet materials at the company's Edmore, Michigan, plant.

Metal-Working News in Brief

Kurt Orban Co., Inc., New York 17, N. Y., has moved its Detroit office and service center to larger quarters at 18627 James Couzens Highway. Over \$75,000 of German machine tools, including lathes, milling machines, grinders, turret lathes, and shapers, have been installed for demonstration and for training plant personnel in the area on the use of the equipment.

— o —

Ellwood C. Howell, advertising and sales promotion manager for the Carboloy Department of General Electric Co., Detroit 32, Mich., died recently of a heart attack. Mr. Howell will be succeeded by **Charles E. St. Thomas**.

— o —

Earl J. Boyer has joined The Sheffield Corp., Dayton 1, Ohio, as application engineer for the Measuray, a non-contact x-ray gage for continuous or intermittent measurement of strip or sheet stock.

— o —

Whitney Chain Co., Hartford, Conn., has announced the appointment of **George A. Banton** as district man-

ager of the company's San Francisco office and **George F. Haag** as West Coast consultant to **A. J. Swisler**, regional manager.

— o —

Littleton C. Barkley, general sales manager, West Coast division of Raybestos-Manhattan, Inc., Passaic, N. J., died recently at San Mateo, California, at the age of 51. Mr. Barkley was with the company since 1926.

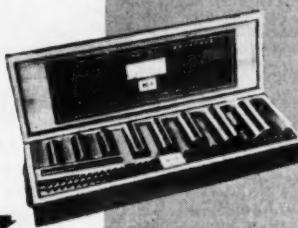
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Metal-Working News in Brief

Genesee Mfg. Co., Rochester, N. Y., has announced the appointment of the **Lee Horneyer Co.**, 7 N. Grand Blvd., St. Louis 3, Mo., as its exclusive representative in eastern Missouri and southern Illinois. The Horneyer Company will handle the complete line of Genesee adjustable hollow mills, fac- ing and counterboring tools, and spe- cial production tools.

Industrial Filtration Division, U. S. Hoffman Machinery Corp., Syracuse, N. Y., has announced the appointment of **Arthur E. Poole** and **Ralph Eads** as sales representatives for the metro- politan New York-northern New Jersey and the Houston-southern Texas areas, respectively.

— o —

The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio, has announced the appointment of **A. H. Davis** as

works manager. Mr. Davis, former-
ly assistant works manager, has been with the firm for 18 years. The company has also announced the appointment of **D. W. LeBlond** as assistant works manager; **L. M. Bouton** as assistant shop super-
intendent; and **D. W. Helye** as night superinten-
dent.

— o —

Penn Scientific Products Co., Philadelphia, Pa., has announced the appointment of **Mosher Industrial Supply Co.**, 15 Exchange St., Chicopee, Mass., as distributor in the New England area for the entire line of Spectrum dia-
mond lapping compounds and Pensco wheel laps and wheel dress-
ing tools.



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Punches • Rod Cutters



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teamed precision
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PRODUCTO DIE SET

makes this
intricate
job
possible



HE fuse terminal, shown below, is produced by the Federal Electric Products Co. for use in their Noark front operated safety switch. A Producto Die Set was selected to maintain the precise production of a top quality die at high speed operation.

Material is half hard 3/32" copper (Rockwell 30-40 B scale), automatically fed to a Niagara 40 ton press. The progressive die stations are 1) pierce and stamp, 2) notch, 3) lance and emboss, 4) form 5) finish form. Die is held to extremely close tolerances. Production: 4000 pieces (1-3/16" x 2-1/8") per hour, 70,000 between grinds.

Today's production calls more than ever for quality control . . . which, in die work, necessitates the best in die sets. Call for Producto . . . and be sure!



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October, 1953

MODERN MACHINE SHOP 365

Book Reviews

Measurement Techniques in Mechanical Engineering. By R. J. Sweeney. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 309 pages. Illustrated. Cloth binding, board covers. Price, \$5.50.

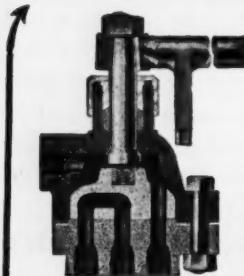
This book serves as a ready source of information on the common measurement techniques used in the performance testing of power equipment, such as engines, pumps, compressors, and combustion and heat transfer apparatus. The volume provides all the theoretical background plus the practical knowledge the engineer or stu-

dent needs to select and use measuring instruments effectively.

The book also establishes an insight into the principles on which instruments are designed and an understanding of the pitfalls and difficulties involved in obtaining a correct measurement of physical quantities with the types of instruments available. The discussion of instruments covers their primary function of measurement and indication, and their function as signalling devices to automatic controllers. Techniques for estimation of error in temperature measurements are presented in compact and concise terms.

Guides to Meeting Tomorrow's Production Needs (Manufacturing Series No. 209). Published by American Man-

This Large Processor Chooses Nicholson Valves for LONG WEAR



136 Oregon St., Wilkes-Barre, Pa.

A large rubber firm reports that Nicholson cylinder control valves recently completed 10 years of constant use, without servicing, on an operation which had proved too much for other tested units. This report further confirms that Nicholson valves, with their specially treated hard seats and non-corrosive lapping flat discs, become tighter with use. For air, gas, oil, steam, water in lever, foot, solenoid and motor types. Press., 300 to 5,000 lbs.

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552

W.H. NICHOLSON & CO.
TRAPS • VALVES • FLOATS

agement Association, 330 W. 42nd St., New York 36, N. Y. 64 pages. Heavy paper covers. Price, \$1.25.

This booklet consists of papers which were presented at the Spring Manufacturing Conference of the American Management Association held at The Hotel Statler, New York, April 8-10, 1953. Titles of the papers are "Federal Controls: Past, Present, and Future," "After Defense Spending—What?" "Preserving Our Economic Resources," "Automation to Date: Progress Toward the Push-Button Factory," "A Cost Reduction Program," "Procedures and Pitfalls in Production Control," and "A Re-examination of Methods Engineering."

Engineering Data on Thread and Form Rolling. Published by Reed Rolled Thread Die Co., P. O. Box 350, Worcester 1, Mass. 44 pages. Illustrated. Paper covers. Price, \$1.00.

The engineering data contained in this booklet have been prepared to provide a source of comprehensive technical information on thread and

form rolling for design and process engineers and those actively engaged in the application of the thread rolling process. Contents are as follows: The Thread Rolling Process; Advantages and Applications of Rolled Threads; Equipment and Tools for Producing Rolled Threads; Rollability of Materials; Preferred Forms for Rolling; Blank Specifications; Thread Rolling Trouble Check List; and Reference tables.



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new shop equipment

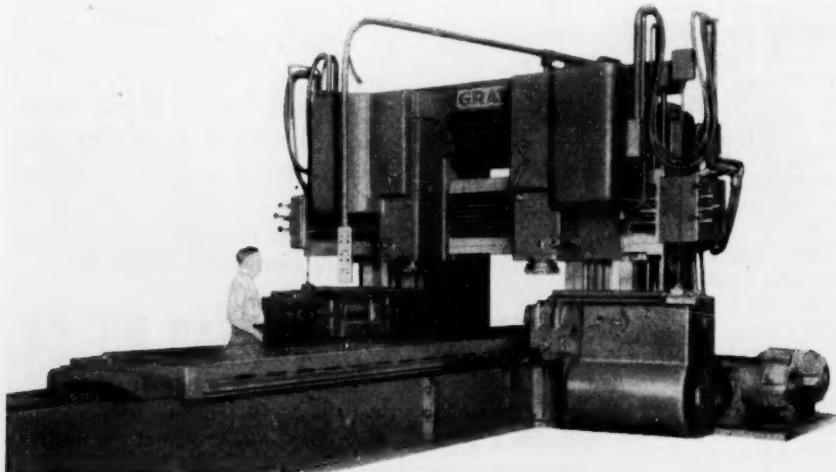
Planer-Type Milling Machine Has Straight-Line Housings

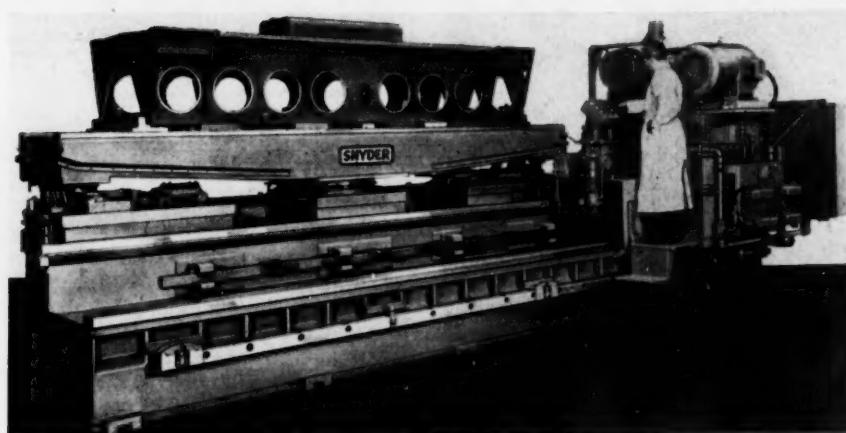
The G. A. Gray Co., 3611 Woodburn Ave., Cincinnati 7, Ohio, has announced a planer-type milling machine which features straight-line housings with 27-inch faces and a full-depth straight-line outer wall to provide strength and rigidity of the side head and rail support. Oversize square locks on the housings and crossrail are said to absorb greatly increased feeding

pressures when cutting in the forward or reverse directions. The machine has a 14-inch quill travel, and spindle speeds, it is claimed, range from 10 to 1,000 r.p.m. in 21 speed changes in approximate geometric progression. Double-opposed taper gibbs are said to permit quick and easy adjustment of the spindle tram, providing fine finish cuts with precision laps.

Elevating screw guards protect the vital elevating screws from abrasive dirt and flying chips, and power head

Gray Planer-Type Milling Machine





Snyder Semi-Automatic Special-Purpose Boring and Facing Machine

swiveling is available as an extra for Gray offset rail heads. The machine also features a power rail feed, an oversize crossrail, and an anti-backlash table drive.

Special-Purpose Boring and Facing Machine Offers Choice of Automatic or Manual Operation

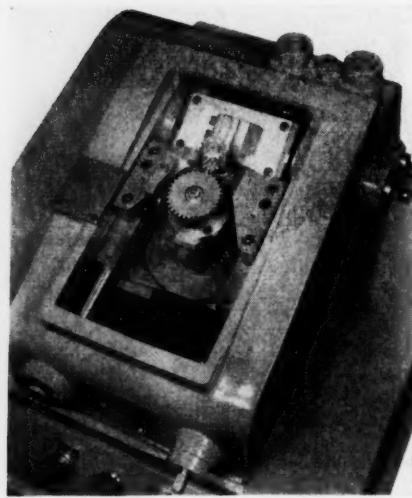
A semi-automatic special-purpose machine for boring and facing hand hole openings in each cylinder center line of welded steel oil pans for large Diesel engines has been announced by Snyder Tool & Engineering Co., 3400 E. Lafayette, Detroit 7, Mich. Affording a choice of automatic or manual operation, the machine consists of a welded steel base 267 inches long x 120 inches wide, the rear section of which carries a fixture centered on a turntable that swings the fixture through a 180-degree arc during the work cycle. In front of the turntable is mounted a hydraulically-operated feed unit, moving upon rails running the full length of the base. The feed unit is indexed by a fluid motor driving a

pinion which engages a rack attached to the base.

According to the manufacturer, the feed rate of the spindle changes after boring from 1.60 inches a minute for boring to 0.80 inch a minute for facing. Spindle speed also changes from 80 r.p.m. for boring to 40 r.p.m. for facing. A maximum of 16 stations may be used. Coolant is pumped from a tank built into the base, and lubrication is effected from two centralized systems operated by hand. Carbide tools are used for the boring and facing operations.

Universal Machine Burrs and Chamfers Entire Gear Tooth Form

Designated as the Universal Burr-Master, a high-speed machine available in various sizes capable of burring and chamfering the entire tooth form of both helical and spur gears from $\frac{5}{8}$ to $9\frac{1}{2}$ inches in pitch diameter, as well as external straight and involute form splines, has been announced by Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 4, Mich.



Close-up view of Modern Universal Burr-Master High-Speed Gear Burring and Chamfering Machine with safety cover removed to show tooling in the head casting

According to the manufacturer, the machine is capable of finishing gears with 22 teeth at a rate of more than 600 per hour at 80 per cent operating efficiency. Simplicity of precision tooling is said to permit rapid change-over from one part to another, eliminating the need for skilled help. Change-over time normally requires 10 minutes.

Tooling consists of a pilot gear, work-holding fixture, tool block, and form cutter. In setting up for a given part, the tooling is developed for the gear to be burred and chamfered and precisely located on the mounting faces of the machine. Positive positioning of the precision-ground toolholder is said to be assured since it nests and is keyed in two directions. Four socket-head screws hold the tool block in position and make mounting or dismounting a quick and simple task. The work-holding fixture is located on the fixture-mounting rails and accurately positioned over hardened

and ground dowels. The fixture is readily secured by four socket-head screws.

The Universal Burr-Master is being built in eight models: BME-14, BME-14C, BME-24, and BME-24C for gears from $\frac{5}{8}$ to $6\frac{1}{2}$ inches in pitch diameter; and BME-19, BME-19C, BME-29 and BME-29C for gears from 3 to $9\frac{1}{2}$ inches in pitch diameter. Models carrying the numbers 24 and 29 are two-station machines, and models with "C" following the number are equipped with a positioning clutch for stopping the tool in the out position.

The machine is driven by a $\frac{1}{2}$ -h.p. motor, with two motors used on the two-station models. The motor pulley is belt-connected to a second pulley, which in turn is belt-connected to a third pulley mounted on a spline

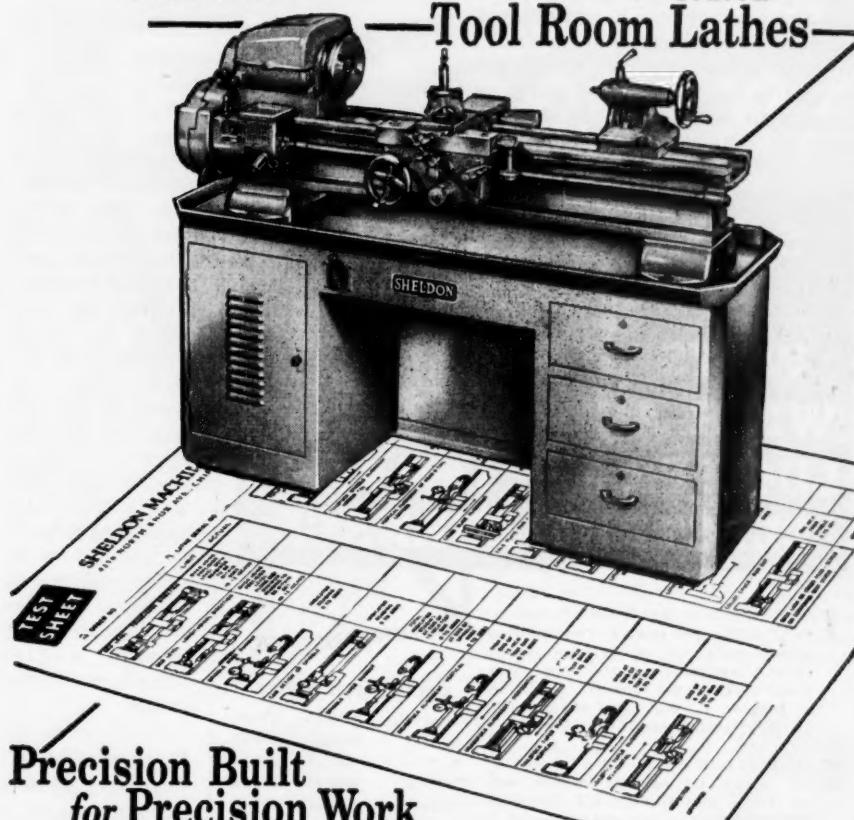


Modern Universal Burr-Master High-Speed Gear Burring and Chamfering Machine

SHELDON

CHICAGO U. S. A.

Tool Room Lathes



Precision Built for Precision Work

Each SHELDON Lathe is a precision machine tool that in final inspection has passed the 19 accuracy checks on the SHELDON "Inspection Test Sheet."

Produced by modern

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SHELDON MACHINE CO., INC.

methods with the finest special machines, these 10", 11" and 12" (swings 13") lathes are quality built on a quantity production basis. Selling at quantity production prices they are today's best lathe values.

4250 North Knox Ave.,
Chicago 41, Illinois

cross shaft. A bevel gear on the spline cross shaft meshes with a second spline shaft which carries the sliding index worm that operates the index worm gear. The worm gear shaft carries the pilot gear. All ratios are 1:1 starting with the spline cross shaft up to the pilot gear. An over-riding clutch located in the final pulley hub is said to prevent damage to the cutter or machine in the event of jamming for

any reason. Once the jam is cleared, the machine, it is claimed, resumes operation with the assurance that accurate gears will be produced.

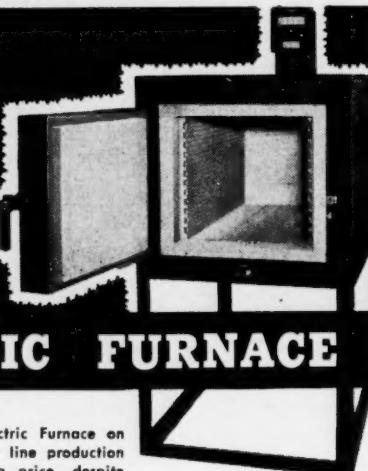
Milling Attachment Is Designed for Machining Aluminum Alloy Forgings

Designated as the Hydro-Drive, a high-speed full-swivel milling attachment designed to machine aluminum alloy forgings for airplane wing hinge sections has been announced by Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

Designed for use on a G & L Table-Type Horizontal Boring, Drilling, and Milling Machine, the attachment is said to be exceptionally well adapted for machining the many varying angles necessary on wing hinges.

Independently driven, the Hydro-Drive Milling Attachment, it is claimed, has no connection with the machine spindle and, therefore, does not depend upon any high inertia driving elements in the headstock of the machine. The headstock acts

**SAVE
3
WAYS
WITH A
LUCIFER
ELECTRIC FURNACE**



1 SAVE with a Lucifer Electric Furnace on FIRST COST. Our straight line production permits economical selling price, despite use of highest quality materials throughout. Check costs on other furnaces . . . feature by feature . . . you'll save money on the Lucifer Electric Furnace EVERY TIME.

2 SAVE ON MAN HOURS with a Lucifer Electric Furnace. Less operator attention needed—Lucifer controls are EXACT. They reach SPECIFIED heat rapidly and retain SPECIFIED temperature without variation. No special experience required when you use a Lucifer Furnace.

3 SAVE on maintenance expense with a Lucifer Electric Furnace. Finest refractory materials are built into Lucifer Furnaces for better, more efficient heat retention. Elements are guaranteed, long lived, trouble free. More than two thousand satisfied users.

CHECK THESE PRICES

Furnace Size	2000°	2300°
6x 6x12"	\$467.00	\$548.00
9x 9x18"	647.50	764.00
12x12x24"	912.00	1068.90
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Complete with 100% automatic electronic controls.

WRITE FOR FREE literature, specifications and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or 'phone today.

LUCIFER FURNACES, INC.

Neshaminy 10, Pa. Phone Hatboro 0411
Successors to Gilbert S. Simonski Company

CUT... OPERATING — MAINTENANCE — SPOILAGE COSTS!

ON YOUR TAPPING JOBS!



NEW "TRU-GRIP" Tap Holder

The exclusive Procunier "Tru-Grip" tap holder is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks. Holds tap true.

Procunier
Safety Chuck Company

12 S. CLINTON ST., CHICAGO 6, ILL.

Procunier Tappers are the last word in economical, efficient, high speed tapping. More and more manufacturers are realizing that Procunier offers them the solution to their steadily rising production costs on many tapping operations. Only Procunier has the unique construction features that permit inexperienced operators to tap like experts. Procunier Tappers provide many extra hours of continuous, accurate tapping without frequent "down-time" interruptions. Procunier Tappers are producing more—with fewer rejections, fewer spoiled pieces and a minimum of broken taps. There are many reasons for Procunier's superiority in the tapping industry. Here are just a few of the many remarkable mechanical improvements that only Procunier provides: new sensitive double cone friction clutch; soft cushioned action driving pressure; ballbearing equipped; heat treated gears; special balanced gear reversing mechanism; smaller-lighter more accurate tru-grip tap holder; and many others.

Write for FREE Brochure

Giving full particulars on the complete line of Procunier Tapping Machines. Learn how you can adapt them to your specific needs.



PROCUНИER SAFETY CHUCK CO.
12 S. CLINTON ST., CHICAGO 6, ILL. Dept. 10

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

Name
Address
City Zone... State.....



take a short cut-
depend upon
Zagar-
holding and
indexing fixtures
for milling, drilling,
tapping and grinding



"Skip" the many special set-ups, jigs and fixtures formerly needed to hold and index. Maintain accuracy and close tolerances. No vertical movement in closing. Stop insures exact duplication of parts. Pipe tap hole provides for lubrication of cutting tools and washes out chips. Index any number of positions from 2 to 25 (4, 6 and 8 divisions standard). 1" and 2" sizes.

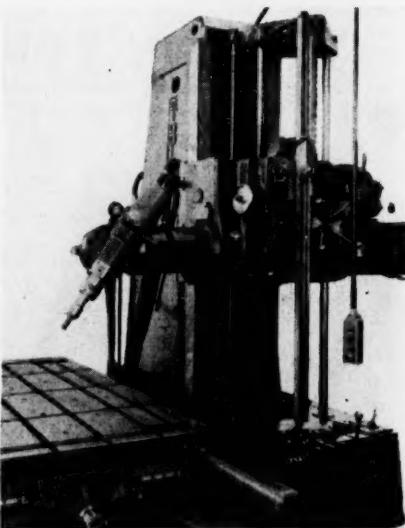
Write for Manual S-10

**ZAGAR TOOL, Inc., 24000 Lakeland
Blvd.**
Cleveland 23, O.



only as a carrier for moving the attachment up and down.

Designed for 360 degrees of horizontal and vertical swivel, the unit has a retractable spindle providing easy cutter retraction and relocation on difficult machining assignments. Quick and easy mounting or removal of the attachment, it is claimed, is possible by means of a special lifting device and quick-disconnecting fittings. According to the manufacturer, the at-



Giddings & Lewis Full-Swivel Hydro-Drive
Milling Attachment

tachment has a speed range of 3:1 and a spindle speed range from 800 to 2,400 r.p.m. for high speed machining of non-ferrous metals.

Assembly Machine Automatically Tightens Nuts or Bolts

Hautau Engineering Co., 721 Wanda, Ferndale 20, Mich., has announced an automatic nut-torquing assembly machine which, it is claimed, will automatically tighten a nut or bolt to a

To Prove Their Valor Redskin Warriors Used Marking Devices

In the Frontier Days, Indian warriors used painted or decorative marking devices to indicate their prowess and to show how many or what kind of coups they had performed.



CADILLAC 115 HAND MARKING MACHINE



GENERAL PURPOSE FLOOR TYPE HAND MARKING MACHINE

Marks: Flat or Round Parts...Parts of Varying Thickness
Rolling Operation for Marking Requires Minimum Pressure

This machine is ideal for many light marking operations and short run jobs . . . its simple construction permits easy changes from one marking operation to another — thereby reducing down-time. Simple fixtures generally suffice for locating parts to be marked . . . specifications for fixtures can be readily met.

Dangers of distortion and fracture are minimized — pressures reduced to barest minimum because this machine rolls the impression into the part.

For full information write for Bulletin L-115



ROLL TYPE HOLDER
Depending on requirements, can be had for either solid or interchangeable type.

MARKING MACHINE AND PUNCH PRESS HOLDERS For Interchangeable

Type

Made of alloy tool steel, all are furnished with a replaceable platen—hardened and precision ground.

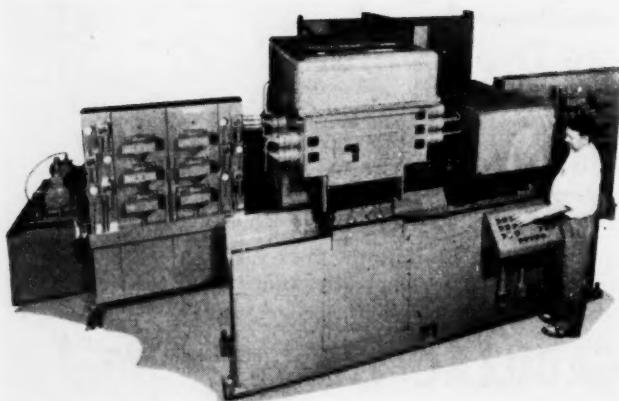


For full information, write for Bulletin SE-130

CADILLAC STAMP CO.

FACTORY and OFFICES
17319 RYAN ROAD • DETROIT 12, MICH.





Hautau Automatic
Nut-Torquing Assem-
bly Machine

given torque specification, tighten a bolt to a specified elongation, or drive a stud to a given depth. The hydraulic-powered multiple-spindle machine is said to act as an automatic gaging machine since an individual spindle will not drive bolts, studs, or nuts if

the thread fits exceed specified tolerances or if the fastener is improperly started. The machine incorporates a patented drive in which each spindle is powered by a hydraulic fluid motor. The motor is either direct-connected to the torquing spindle or a double-enveloping cone-drive worm gear set is provided in the drive, depending on the torque requirements.

According to the manufacturer, the torque capacity of the machine is from

HYDRAULIC INDEX TABLE

This table is driven by a fluid motor and is locked in the indexed position by a hydraulically operated shot bolt. The table rides on hardened and ground wear strips, is automatically lubricated, and the table spindle is mounted in heavy-duty tapered roller bearings.

Can be furnished in sizes 30", 36", 42" and 48".

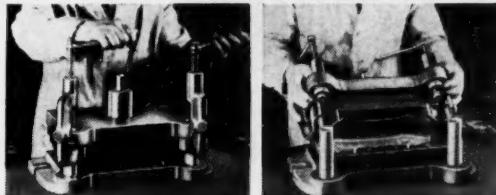


Lee Engineering Company, Inc.
4700 BURLINGAME • DETROIT 4, MICHIGAN

Separate Die Sets This Fast, Simple Way...

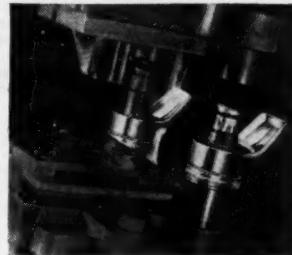


The principle of the Acro Die Set Puller is to remove the punch holder from the die shoe by a straight upward pull, whereby punch holder travels upward from die shoe axially, leaving both leader pins simultaneously. This is accomplished only by use of the indexed screw wrenches which act as indicators, controlling the upward travel. This is an exclusive patented Acro feature, found only in Acro Die Set Pullers.



AND, Protect Leader Pins With These Efficient Oilers

Acro Pin Oilers fit over each leader pin and seal in place with a rubber neoprene washer. Each cup is filled with oil so each downward stroke brings bushing in contact with oil and each upward stroke distributes oil evenly over leader pins. Eliminate bushing wear, leader pin scoring, and maintain die accuracy. Die sets equipped with Acro Pin Oilers have run under tests for several weeks to a month without refilling.



Free Data

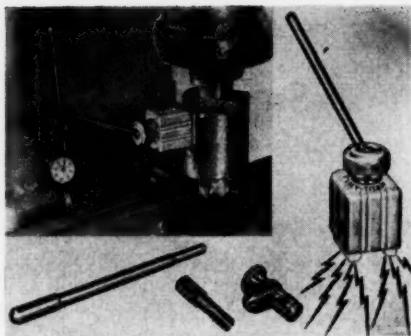
Covering each of these and other profitable Acro accessories is included in our folder. Write for bulletin MM.

ACRO
Metal Stamping Co.
334 EAST RESERVOIR AVENUE
MILWAUKEE 12, WISCONSIN

35 to 120,000 inch pounds. Torque specifications, it is claimed, can be held within a 2 per cent tolerance and length or elongation within 0.0004 inch. The machine measures 20 feet long x 11 feet deep x 8 feet high.

Magnetic Base Dial Indicator Holder Has 65-Pound Pull

Designated as the "Tiny-Titan" No. 100, a magnetic base dial indicator



Enco "Tiny-Titan" No. 100 Magnetic Base Dial Indicator Holder



COLLET EQUIPMENT

Use-Em-Up Type Drill Sleeves

Use-Em-Up Type Drill Sockets

Standard Type Drill Sleeves

Standard Type Drill Sockets

Short Shank Type Sleeves

Short Shank Type Sockets

B. & S. Taper to B. & S. Taper Sleeves

B. & S. Taper to Standard Taper Sleeves

Standard Taper to B. & S. Taper Sleeves

Rough Shank Sockets

Solid Type Sockets

Morse Taper Shank Tap Sockets

Standard Spot Facing Cutter Bars

High Speed Point Lathe Centers

Carbon Steel Lathe Centers

Pipe Centers for Lathes

Lathe Bushings

Blank End Arbors

Chuck Arbors

Drill Drifts

Magic Type Chucks and Collets

Standard tools for all drilling, reaming, and tapping needs and special tools to order. Immediate attention to regular or special requirements.

THE COLLIS COMPANY
CLINTON, IOWA

Dept. A

holder which mounts instantly to flat or rounds down to $\frac{3}{4}$ inch in diameter with a pull of 65 lb. has been announced by Enco Mfg. Co., 4520-26 W. Fullerton Ave., Chicago 39, Ill. The unit incorporates a ball swivel of brass and a stem of a non-magnetic material which isolate the magnet from the indicator. According to the manufacturer, a knurled lock nut quickly secures the post position firmly, and a three-step universal rod, 6 inches in length with diameter sizes of $7/32$, $1/4$, and $5/16$ inch, accommodates all indicators.

The unit utilizes a swivel adapter which is said to allow a full 360-degree adjustment in all directions. An adapter for attaching 5/32-inch stud-type indicators is also furnished.

HARDENED and GROUNDED HSS BLANKS

Any decimal diameter to $\frac{1}{2}$ " — in any length. Mirror finish surface to gage tolerance. Many uses — punches, gages, measuring wires, special tools, etc. Quick delivery.

Write for price list D-2
WILLIAM T. HUTCHINSON COMPANY
235 Main St. Orange, N. J.

Portable Pneumatic Riveter Features Rotary Impact

Designated as the Airflex Model SP, a portable pneumatic riveter which features rotary impact, which requires only a slight steady pressure for proper operation, and which tends to feed itself has been announced by Lemert Engineering Co., Inc., 204 E. Jefferson St., Plymouth, Ind. The spinning ac-



Lemert Airflex Model SP Hand Riveter in use

tion of the tool is said to eliminate any extreme jumping and contributes to smooth operation. According to the manufacturer, the riveter easily gets into hard-to-reach places and unusual positions. The tool weighs 7 lb., measures 15 inches in length, and can be used safely on fragile, as well as ordinary, materials.

The Model SP hand riveter is available in three sizes to handle $\frac{1}{8}$ to $\frac{5}{16}$ inch rivets. Construction features of the tool include specially hardened valve seats, Timken roller bearings, sealed-in grease, and cylinder and piston of tool-steel quality and ground and lapped to within 0.001 inch.

NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

BENCH CRANK PRESS

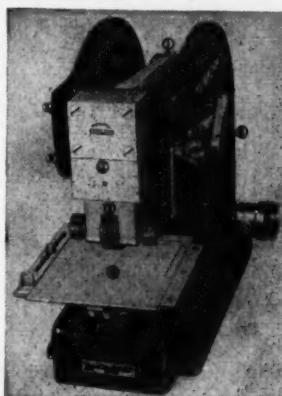
*For Numbering, Marking,
Stamping*

Designed for use in stamping name plates and small parts, eliminating the use of a power press. The ram head will take Type Holders, Numbering Heads and special Dies. A tripping attachment can be supplied for use with automatic numbering heads for consecutive numbering.

Model 131 is hand operated by a lever. Press is powerful and easy to operate.

Model 132 is operated by a 3" air cylinder. Operation is controlled by a 4-way hand or foot valve. Ideal for stamping up to ten $\frac{1}{8}$ " characters in aluminum plates. Model 133 is operated by a motor through an eccentric having a releasing device, allowing it to stamp once each time control lever is depressed. Stamps continuously if control lever is held down.

Write for Bulletin MS-131.



MODEL 133

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

Machine Is Designed for Drilling Radial Holes

A standard machine which is designed for drilling radial holes in a wide variety of parts has been placed on the market by Govro-Nelson Co., 1933 Antoinette, Detroit 8, Mich. According to the manufacturer, any number of Govro-Nelson Automatic Drilling Units up to eight may be employed, the units being movable not only through 360 degrees on the circular

table but also movable endwise on riser plates to meet the requirements of the part being drilled. The machine



Govro-Nelson Universal Radial Hole Drilling Machine

MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels.



Ask for Descriptive Circular
MUMMERT-DIXON CO.
120 Philadelphia St. • Hanover, Pa.



may also be used for tapping operations with Govro-Nelson tapping units.

The machine has a range of 1/32 to $\frac{3}{8}$ inch on drilling operations and 0-80 to $\frac{3}{8}$ -16 on tapping operations, depending on the material and spindle speeds. A single, momentary-contact start button is used to operate all units simultaneously.

Combination Rotary Table and Angle Plate

Olson Industrial Products, Inc., 40 W. Water St., Wakefield, Mass., has

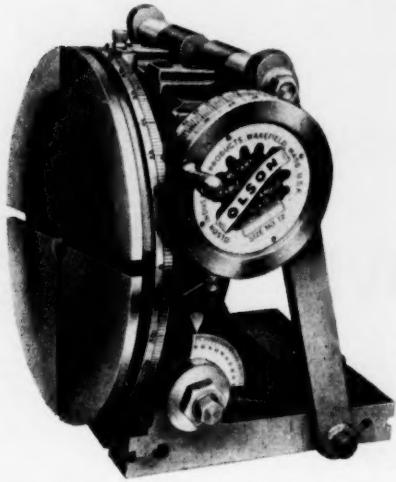
Quick
Shipment on
**TAPER
ATTACHMENTS**

For All Lathes—Old or New—
9" to 36" Swing
Write for Bulletin

MASTER-TAPER COMPANY
4531 N. Beacon St., Chicago 40
Excl. Mfrs. of Taper Attachments

\$29.50
to
\$149.50

announced a two-in-one combination rotary table and angle plate, designated as the Model 12, which is said to be adaptable to most all type machines. As a rotary table, the unit can be either hand operated or power driven for work in any position parallel to the table or at any angle up to 90 degrees. A handwheel with vernier is said to allow a table reading to 2 seconds of arc. The unit incorporates a worm which is said to be ball-bearing mounted, self-aligning, and readily ad-



Olson Model 12 Combination Rotary Table and Angle Plate

justable from the outside to permit free operation without excessive backlash. The table is designed for rotary milling at any angle and for all angular drilling and boring setups.

As an angle plate, the unit is hand operated for work in any position parallel to the table or at any angle up to 90 degrees. Elevation setting of the plate is controlled by the worm and worm gear. The angle plate is designed for difficult angular machining operations. The table measures 11½ inches in diameter.

KIPP
Air Grinders

- FASTER SPEEDS
- BETTER RESULTS
- LOW PRICES

MODEL JA
50,000 R.P.M.
Weight 12 ounces; length
6½ inches; chuck size
½ inch. Wheel guard re-
moved for better illustration.

\$42
IN U.S.A.

THEY GRIND—NOT JUST RUB!

The RPM's stay up while grinding . . . not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind . . . not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work . . . longer wheel life.

MADISON-KIPP CORP.
208 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog at 3006

Magnifying Lens Unit for Bifocal-Wearing Welders

Designated as Ortho-Weld, a magnifying lens unit which are designed to provide improved vision for welders who wear bifocal glasses has been announced by Bausch & Lomb Optical Co., 50519 Bausch St., Rochester 2, N.Y. The unit, precision-molded of Lucite, is made to fit all standard welding helmets. By inserting the unit between the regular helmet filter lens and the

rear cover plate of the lens holder, the bifocal-wearing welder, it is claimed, is given comfortable close-up vision at any angle.

The magnification provided by the unit is needed because of bifocal segment of regular glasses is out of the line of vision while the helmet is in working position. Although designed primarily for bifocal wearers, the unit can be a valuable optical aid to all welders as a magnifier where precision work is required.

The Ortho-Weld Lens Unit consists of two lenses molded in a

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"On the Spot"
DELIVERY . . . from STOCK
Chicago

"V"--BELT DRIVES

Over 100,000 fractional H.P. pulleys are carried in stock for your immediate delivery.



Sizes range from 1 1/2 to 14" in diameter for "A" - "B" and "O" section V-belts. Make our stockroom your warehouse when you specify

Chicago
V-BELT DRIVES.

Construction: All pulleys are Die Cast from the best grade of zinc base alloy, then are accurately finished to give you years of satisfactory service.

For complete information write for Catalog No. 6752.

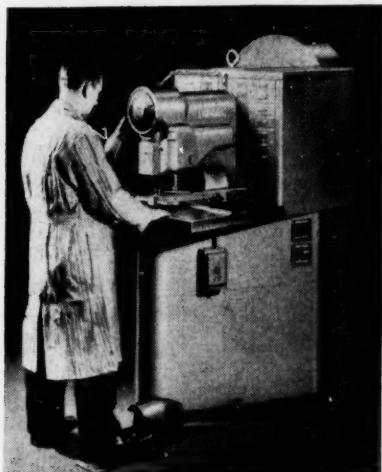
MFG'D BY
Chicago DIE CASTING MFG. CO.
2510-14, WEST MONROE STREET
CHICAGO 12, ILLINOIS

Illustration showing Bausch & Lomb Ortho-Weld Magnifying Lens Unit being fitted into welding helmet

single piece, surrounded by a supporting frame. Each lens is centered for comfortable vision, allowing full use of the helmet window. Ortho-Weld lenses are available in four strengths or powers, with a range to fit the needs of most bifocal wearers in industry.

Sheet Metal Fabricator Punches, Notches, and Nibbles

Designated as the Wales Model 10-AA, a sheet metal fabricator which punches, notches, and nibbles has been announced by Wales-Strippit Corp., 398 Payne Ave., North Tonawanda, N. Y. The machine incorporates an improved Hydra-New-Matic Head which is said to operate with a minimum of vibration and noise at 165 strokes per minute for single-hole punching and for nibbling.



Wales Model 10-AA Sheet Metal Fabricator
in use

According to the manufacturer, rapid interchangeability for punching, notching, and nibbling is afforded by the fabricator by means of a $1\frac{1}{4}$ -inch holder which incorporates the Wales "Quick Change" System that permits 10-second changing of punches and dies for punching various round and shaped holes up to $1\frac{1}{4}$ inches in diameter. A $3\frac{1}{2}$ -inch holder is said to provide for punching various round and shaped holes up to $3\frac{1}{2}$ inches in diameter and only requires the interchangeability of three parts—punch tip, strip-



Self adjusting . . .
Powerful springs
keep the bearings
and shaft chatter-
free regardless of
wear or tempera-
ture change.

Grease lubricated. No oil of any kind
required. Bearings and spindle are
grease packed and sealed at assembly.

Fine finishes are assured . . . The
spindle assembly is precision balanced
on its own bearings. These ball bear-
ings are the most accurate obtainable.

Completely Interchangeable . . . This
unit replaces the old bearing assembly
on your present grinder.

Use your original pulley and wheel
mount . . . No need to buy special
attachments.

Write Today for Price and Delivery

The Whitnon
MANUFACTURING CO.
217 High St. New Britain, Conn.

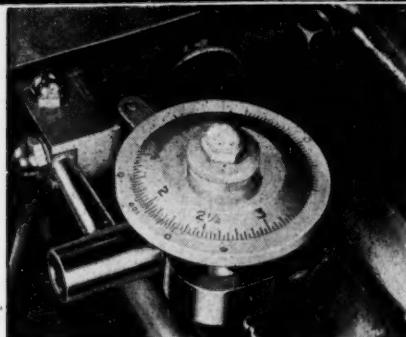
ping plate, and die. Adjustable back and side gages on the 1 1/4 and 3 1/2-inch holders provide for accurate hole locations.

Air Control Manifold Valve Regulates Pressure in Reduced Space

Designed for use on mechanical presses to control air pressures on such devices as die cushions, counterbalance

cylinders, clutches and brakes, and automation auxiliaries, an air control manifold, which also offers advantages for many types of pneumatic circuits that require pressure regulation, has been announced by Danly Machine Specialties, Inc., 2100 S. Laramie Ave., Chicago 50, Ill. Essentially, the unit consists of a globe shutoff valve which admits the compressed air supply, an adjustable pressure regulator, a pressure gage which is protected from line fluctuations by a needle valve, a check valve, and a globe exhaust valve, all of which

YESTERDAY'S PIONEER . . . TODAY'S LEADER



Danly Air Control Manifold

are housed in one unit measuring only 10 inches from inlet to outlet.

According to the manufacturer, the design of the air control manifold permits the use of special headers when more than one manifold is required. The headers are available in two, four, six, and eight-station units and are said to be ideally suited for the addition of filters and lubricators.

WELDON . . . MEASURING ATTACHMENT

(*Direct Reading*) **Saves Time • Reduces Waste**

● This handy Weldon attachment measures directly the forward or reverse movement of the lathe carriage, within .001 of an inch. Easily attached to most lathes by drilling and tapping of one hole. ● Dependable, accurate, convenient—saves time and reduces work spoilage.

WRITE FOR CIRCULAR LA-1

*Weldon distributors throughout U. S. A. and
Canada carry complete stocks to serve you.*

THE WELDON TOOL COMPANY



3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO

Soapstone Holder Minimizes Stone Breakage

See-Line Co., Inc., 618 Amarillo Bldg., Amarillo, Texas, has announced a soapstone holder which is said to minimize loss from soapstone breakage. Weighing only 3 oz., the holder is provided with a strong, durable clip. An automatic locking device adjusts the soapstone to any length for differ-



See-Line Soapstone Holder

ent marking conditions. According to the manufacturer, the holder is ideal for metal workers, welders, plumbers, and numerous other trades in which metal marking is essential.

eye it → try it → buy it

BALL PEIN HAMMERS by BILLINGS

THEY CAN TAKE IT! It's the opinion of men doing those tough jobs—punishing jobs where a hammer must take a steady hourly beating day in and day out.

Here are some of the reasons why . . . (1) Heads are Vitalloy® Forged of selected alloy steel, (2) Held within controlled specified hardness limits, (3) Heat treated to develop the utmost in physical properties, (4) Every head Magnaflux(*) inspected, (5) Distinctive convex shape of Eye, (6) Securely driven wedges interlocked for safety, (7) Billings guarantee of sound, perfect Heads, (8) Handles of selected, second growth hickory, waxed, (9) Two finishes, full polished (Model AD) and black with bright Face and Pein (Model BC).

*One of the best methods of indicating cracks or flaws in the structure of steel.



SAFETY EYE
CONSTRUCTION



INTERLOCKING WOOD
AND METAL WEDGES

Yes, Billings Hammers can take it! Buy 'em from Billings Industrial Distributors.

BILLINGS

THE BILLINGS & SPENCER CO.
HARTFORD 10, CONN., U.S.A.
Quality Tools & Forgings Since 1869

Self-Releasing Expanding Mandrel Is Accurate to 0.0005-Inch T. I. R.

A self-releasing precision expanding mandrel which is designed for use wherever dimensions must be held accurately concentric with the i.d. and which is said to be guaranteed precise to 0.0005-inch t.i.r. has been announced by Erickson Tool Co., 2303T Hamilton Ave., Cleveland 14, Ohio. The mandrel is available in two sizes, the smaller of which handles work rang-



Erickson Self-Releasing Expanding Mandrels

ing from $\frac{1}{2}$ to $\frac{5}{8}$ inch i.d. and the larger being designed for use with work starting with a 15-inch bore.

According to the manufacturer, cam surfaces of the alternately-slotted sleeve mate with corresponding surfaces of the shank within 0.0001 inch. When the pin is drawn back against the end surface of the sleeve, the sleeve is said to expand equally over its entire length.

Relief of the force immediately relieves the mandrel's grip. The sleeve expands over a range of $1/32$ inch, and the shank accommodates a number of sleeve sizes.

HIGH SPEED DRILLS FLAT TWISTED AND ROLLED SECTION

Special Lengths and Types

PROMPT DELIVERY

Manufacturers Since 1903

HI-DUTY DRILL WORKS
FLEETWOOD, PA.



Sturdy 16 ga. metal.
20" long x 12" wide
x $6\frac{1}{4}$ " deep. Drag
holes and handles at
both ends.

J. I. LUCAS & SON, INC.
Bridgeport 5, Conn.

PRODUCTION INCREASES... with TROYKE ROTARY TABLES



Troyke Mfg. Co.,



Sizes:
9 - 12 - 15 - 18 - 21 - 25.

See your dealer or write for
Catalog No. 17, fully illustrated,
showing all models and applica-
tions to various work.



Dividing Attachments can
be furnished for all models
of Wormwheel operated
Rotary Tables except the
Model BH-9.

Cincinnati 9, Ohio, U. S. A.

veloped by The Sheffield Corp., Dayton 1, Ohio. The machine is used to simultaneously inspect profile and alignment, head to shoulder dimension, overall length, extractor groove, primer depth, head diameter, and head thickness of a complete round of 30 caliber armor piercing ammunition. Rounds are also automatically segregated into four classes, including acceptable and rejects on dimensions, overweight, and underweight.

The machine is push-button operat-

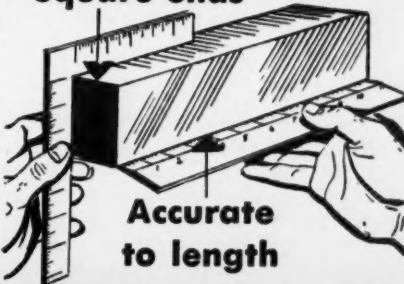


Sheffield Automatic Gaging Machine

ed, and there are only two gaging stations, plus a few simple, short mechanical movements. The cartridge feeds from the hopper into a split-chamber gage station connected to Sheffield Electrichek gage heads. Individual lights on the diagram panel—one for each dimension or condition—indicate whether acceptable or plus or minus.

When the dimensions and weight are within tolerance, the lights black out. If not, a red or clear light indicates a plus or minus condition,

Square ends



Accurate
to length



Ask for our Circular
Sawing Handbook.



Segmental—11" through 108" dia.
Solid—8" through 20" dia.

Down with scrap! Up with usable production! Whatever the material or shape or size, Motch & Merryweather has a segmental or solid blade for the job. You get highest practical speeds, ends square and burrless, cut-off pieces meeting close tolerances. Resharpen repeatedly at low cost. Obtain Triple-Chip long life and economy.

* * *

THE MOTCH & MERRYWEATHER MACHINERY CO.

715 PENTON BUILDING
CLEVELAND 13, OHIO



BETTER-TECHNIQUE
IN CUTTING

Only
TM
ALL 3:
CIRCULAR
SAW BLADES
CIRCULAR
SAW BLADES

respectively. The machine measures 40 inches long x 30 inches wide x 57 inches high, overall.

Steel Industrial Workbench

Designated as "Scotty," a steel industrial workbench which is available in three types—Model 9195-S with a heavy steel top, Model 9195-W with a $1\frac{3}{4}$ -inch laminated hardwood top, and Model 9195-N with a $1\frac{1}{4}$ -inch Nat-

Flex top—has been announced by Shure Mfg. Corp., 1601 S. Hanley Rd., St. Louis 17, Mo. The bench is available in 48, 60, and 72-inch lengths and 29, 30, 34, and 36-inch widths. The bench is 34 inches high and is standard green in color.

Nat-Flex consists of many layers of selected woods, pressure-laminated and topped by a $\frac{1}{4}$ -inch thick tough surface-sealed plastic-base composition. According to the manufacturer,

Nat-Flex is a non-conductor; is resistant to oil, grease, water, and abrasion; will not fracture or

DY-NAMIC BALANCING

reduces stress, produces smooth operation of our crankshafts... and makes it so EASY TO LOCATE EXACT POINT OF UNBALANCE...

QUICKLY,
ACCURATELY!

says M. W. Stiller,
Prod. Mgr., Joy Mfg. Co.,
Michigan City, Ind.
A Model 375 "Bear"
Machine is used here
to balance crankshafts for
portable air compressors.

Photograph shows
operator drilling away
excess metal at point
of unbalance.

For your copy
write: Bear Mfg.
Co., Dept. M-25,
Rock Island, Ill.

298

Speed and accuracy are but two of many advantages which make "Bear" Dy-Namic Balancing the proven technique to reduce wear of valuable machinery... eliminate noise and vibration... and improve performance of the finished product.

SEND FOR FREE DY-NAMIC BALANCING MANUAL to learn of all the advantages of "Bear" Machines. 20 pages of tables, diagrams, application photographs and latest technological developments help show you how Dy-Namic Balancing can cut costs, mechanical failures and maintenance expense in your operation.



"BEAR"

STATIC AND DY-NAMIC BALANCING MACHINES
balance rotating parts weighing from 4 oz. to 8 tons



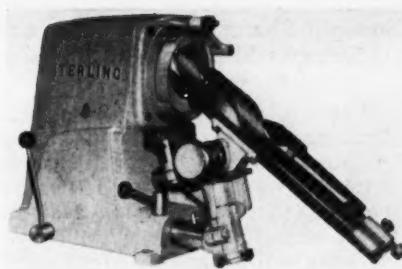
(Top to bottom)
"Scotty" Models
9195-S, 9195-W, and
9195-N Industrial
Workbenches

break; is easy to keep clean; and deadens sound and reduces vibration. Special-size benches can be made to meet specifications.

Bench Grinder Has Capacity for $\frac{1}{8}$ to 2½-Inch Drills

Designated as the Sterling Model "DB," a bench drill grinder which has a capacity for $\frac{1}{8}$ to 2½-inch drills and which is said to be capable of handling 2, 3, and 4-lip drills without a change in setup has been announced by McDonough Mfg. Co., 1521 Galloway, Eau Claire, Wis. According to the manufacturer, the grinder is a single-purpose machine and does not have a carbide grinding feature. No collets or jaws are required to hold the drills.

All of the Sterling drill grinder features, including a built-in diamond holder for accurately dressing the wheel, are incorporated in the Model



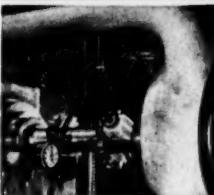
Sterling Model "DB" Bench Drill Grinder

DB. The machine utilizes a heavy-duty $\frac{1}{2}$ -h.p. motor and a straight cup wheel measuring 6 x 1½ x $\frac{1}{2}$ inch with a 4 x 1 inch recess is used.



TINY-TITAN NO. 100

New Superior Magnetic Base Holder



Model 100 being used to align fixture in production mill.

FOR MOUNTING TEST INDICATORS INSTANTLY TO FLAT OR DOWN TO $\frac{3}{4}$ " ROUND WITH PULL OF 65 LBS.

- Every indicating problem now easily solved.
- No more indiscriminate clamping.
- All materials and workmanship unconditionally guaranteed.

NEW!

3-step universal rod for all indicators. Sizes: $\frac{1}{8}$ ", $\frac{1}{4}$ " and $\frac{1}{2}$ " diameters.



NEW!

Fool proof adapter for allowing 360° adjustment in all directions.



NEW!

Magnetic pull 65 lbs.



PRICE \$8.00
COMPLETE.
Attractively boxed.

NEW!

Sure-grip non-breakable tenite plastic case $1\frac{1}{4}$ " wide, $1\frac{1}{8}$ " long and $1\frac{1}{2}$ " high.

SEND NOW FOR BULLETIN NO. 605 COVERING OTHER TINY-TITAN TOOLS

NO. 120	Combination magnetic base indicator holder and magnifier, pull 65 lbs.	\$12.50
NO. 130	Precision adjustment magnetic base holder, pull 65 lbs.	\$ 9.50
NO. 150	Heavy duty duplex magnetic base holder, pull 125 lbs.	\$15.50
NO. 160	Precision adjustment heavy duty duplex magnetic base holder, pull 125 lbs.	\$17.75
NO. 200	Magnetic base "HANDI-LITE," pull 65 lbs.	\$ 8.50
NO. 250	Heavy duty magnetic base lighting unit—holds 100 watt bulb, pull 125 lbs.	\$18.50

ENCO MANUFACTURING COMPANY, Dept. 1103
4520-26 W. Fullerton Ave., CHICAGO 39, ILL.

Order from your mill supply dealer or send order with name of your mill supply dealer

Straight Shank Straight Flute and Straight Shank Spiral Flute Reamers

Whitman & Barnes, Plymouth, Mich., has announced the addition of new sizes to its regular line of straight shank straight flute and straight shank spiral flute chucking reamers. In the straight flute type, the following sizes will be considered standard: all 64th sizes from 3/64 through 31/64-



Whitman & Barnes Straight Shank Spiral Flute and Straight Shank Straight Flute Chucking Reamers

inch in fractional sizes; No. 1 to No. 60 inclusive, in wire gauge sizes; A to Z inclusive, in letter sizes; and 0.124, 0.126, 0.1865, 0.1885, 0.249, 0.251, 0.3115, 0.3135, 0.374, 0.376, 0.374, 0.376, 0.4365, 0.4385, 0.499, and 0.501-inch in decimal sizes. In the spiral flute type, all 64th sizes from 5/64 through 31/64-inch will be considered standard.



CIF Coupling: 1 to 64 hp. at 100 rpm . . . max. bore 1 1/8 to 5 7/8.

*COMPACT—fits right into the flywheel . . . saves space required by conventional hub length

*ECONOMICAL—elimination of one flange affords cost saving over standard flywheel couplings

*MAINTENANCE FREE—cushions changed without shutdown . . . no lubrication required

LOVEJOY Flexible Couplings provide maximum alignment correction, extra smooth power transmission . . . absorb vibration, starting torque and shock of intermittent loads . . . assure optimum motor and machine performance. Cushions are made of materials best suited to load conditions.

There's a LOVEJOY Flexible Coupling for every requirement.

Write today for Catalog and Handy Selector Charts



LOVEJOY FLEXIBLE COUPLING CO.

5007 WEST LAKE STREET

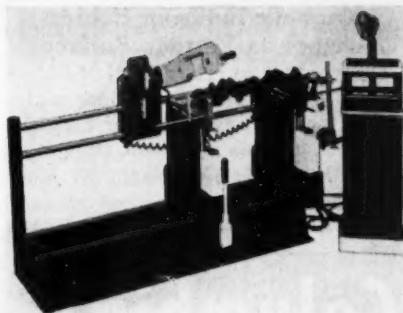
Mfrs. of Flexible Couplings, Universal Joints, Variable Speed Transmissions, and Variable Speed Pulleys.

CHICAGO 44, ILLINOIS

rous materials. The tools are silver-solder brazed and feature rugged cold-drawn steel shanks. The cutting edges are plastic dipped for protection.

Electronic Industrial Balancer for Maintenance and Production Operations

Designated as the Stewart-Warner Model 704, an electronic industrial balancer which is designed for maintenance, as well as production, balancing and which has an unusual range in capacity has been announced by Merrill Engineering Laboratories, Dept. 21A, 1240 Lincoln St., Denver 3, Colo. High-speed milling heads, cutters, and grinding wheels, it is claimed, may be precision balanced to minimize marks due to vibration, and, by minimizing vibration, speeds may be increased for fast cutting with maximum safety to the operator. The drive mechanism is



Stewart-Warner Model 704 Electronic Industrial Balancer

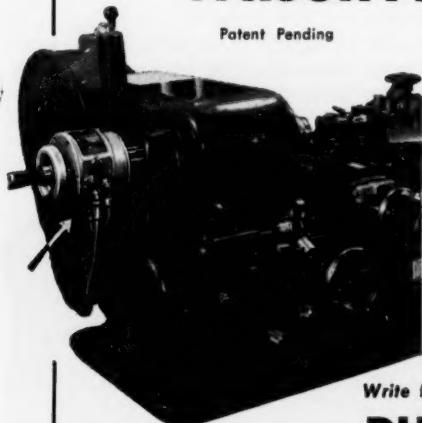
operated by twisting a handle which is also used as a brake after readings are observed, and setup to various length is accomplished by a simple walking mechanism.

The length range of the machine is 4 1/2 to 55 inches between bearing surfaces, and diametral capacity is 1/2 to 44 inches.

NOW! FOR LATHE OPERATORS "A THIRD HAND"

Wilson Air Collet Closer

Patent Pending



Gives you increased production . . . and greater accuracy

BY SOLVING THESE PROBLEMS . . .

- ✓ Adjustment for variations in stock or machined parts—automatic take-up.
- ✓ Holding delicate parts or tubing. Eliminating slippage of work—Finter-tip or "iron-hand" grip through controlled air pressure.
- ✓ Holding consistent accuracy—all parts held with a consistent air pressure.
- ✓ Reducing fatigue—Foot or "finter-tip" control speeds first and second operation work.

Write for folder . . . Dealers needed in some cities.

DURABLE PRODUCTS
814 W. 50th St., Minneapolis 19, Minn.

Leakproof A neoprene inner-tube eliminates leaky rings, piston and packings.

Magnetic Indicator Holder Attaches to Ferrous Surfaces

Designated as the "Miti-Mite," a magnetic base indicator holder which will attach to any round or flat iron or steel surfaces has been announced by Lufkin Rule Co., Saginaw, Mich.



Columbia

TOOL STEELS for
all tools for all purposes



**HOT WORK-
SHOCK RESISTING:**

Formite
Firelite

Formite No. 2
Buster C.E.C.



Main Office & Works
Chicago Heights 6, Ill.

Lufkin "Miti-Mite" No. 100 Magnetic Base Indicator Holder with dial indicator attached

Said to be ideal for use on lathes, shapers, mills, planes, and other machine tools, the unit utilizes a powerful permanent magnet which is capable of holding nearly all dial indicators. The swivel action post can be quickly and firmly secured in position by means of a knurled lock nut. A sensitive friction joint, it is claimed, provides accurate adjustment.

The unit is available in three models; namely, Model No. 100 with a permanent magnet pull of 50 lb.; Model No. 101 which is the same as the No. 100 but with an extra-fine adjustment feature; and Model No. 150 which is a heavy-duty unit, incorporating a permanent magnet that is said to provide a 100-lb. pull.

Specify Arbor Spacers and Shims

For milling, slitting and gang-saw setups, shimming gears and bearings. Sets in 20 diameters $\frac{3}{8}$ " to 4", 19 graduated thicknesses .001" to .125", specials over .125". Spacers with keyways, shims without. Stocked by Industrial Distributors.



DETROIT STAMPING COMPANY

349 MIDLAND AVENUE • DETROIT 3, MICHIGAN

Interference Microscope Has Measuring Range from 0.04 to 4 Micro-Inches

C. E. Johansson Gage Co., 10641 Haggerty Ave., Box 4086 Northeastern Station, Dearborn 1, Mich., has announced the CEJ Multiple Interference Microscope which, it is claimed, has a measuring range from 0.04 to 4 micro-inches. The multiple interference microscope incorporates a stand on which the interference microscope and a lamp housing move. The interference plate is attached to the lower part of the microscope. The design of the



CEJ Multiple Interference Microscope

stand is said to allow large test pieces to be inserted, and the instrument can be placed directly on a large plane, as well as curved surfaces, by removing the measuring table and lowering the microscope directly toward the test surface. The mi-

croscope can be turned around the column so that measurements can be made on pieces placed outside the stand.

The CEJ Multiple Interference Microscope is furnished in a portable wooden case which contains a box for interference plates, fixing clips for test pieces, and auxiliary tools. Interference plates are not included as standard equipment and must be ordered for every particular occasion.



Saves You Hours

On Intricate



Internal holes
and
irregular dies



Convex or
concave surfaces



Tool edges



Internal or
external tapers



Shoulders
and recesses

The Di-Profiler is a dispensable dispensing tool and more . . . Far superior to manual operation, it is used for finishing straight or curved surfaces, small holes, dies, molds, regular or irregular drawing dies, reworking hardened material and for many other similar jobs.

Light — Fast — Precise
Variable Speed and Stroke

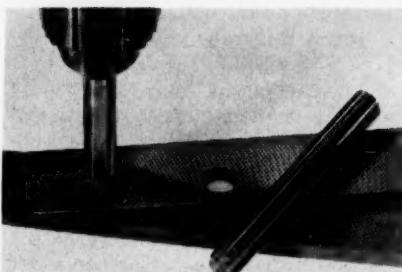
The Di-Profiler has a controlled stroke variable from 0 to 6 mm (1/4 inch), and a speed of reciprocation that can be varied from 0 to 100 strokes per second. It is simple in construction, free from vibration, weighs less than one pound, and is accurately and easily controlled during operation.

For Complete Information Write For
New Technique Folder D-1053

ENGIS EQUIPMENT COMPANY

Improved Drill Is Designed for Drilling Hardened Steel

The Tempered Steel Drill Co., 3610 Superior Ave., Cleveland 14, Ohio, has announced an improved drill which is designed for drilling hardened steel as hard as 68 Rockwell without annealing. The improved drill features three wide lands which, it is claimed, keep the drill from floating. Oversize holes are said to be eliminated due to the



"Tempered Steel" Improved Drills

greater bearing surface of the wide lands. Another improvement is the heavy center section that overcomes drill breakage caused by the pressure required to drill hardened steel.

According to the manufacturer, the drill is also practical for use in countersinking, reaming, or enlarging drilled holes in hardened steel, finishing the holes to the correct size.

**"Why
didn't
someone
TELL
ME?"**

"What's the idea of secrets? Why didn't someone tell me these high repair charges on Welding Equipment are unnecessary? Why didn't someone say that Smith's have *Lifelong*

Guaranteed Torches that don't cost anything to repair! That's what we need around here!"

Mail us a card today.

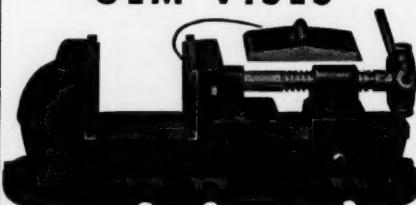
SMITH WELDING EQUIPMENT CORPORATION

Dept. MMS-61, 2635 S.E. 4th St., Minneapolis, Minn.

Milling and Routing Machine

Designated as the Model 1-24 Hydro-Router, an automatic tracer-controlled milling and routing machine which is designed to perform difficult jobs fast and accurately is being marketed by Turchan Follower Machine Co., Dept. MS, 8259 Livernois Ave., Detroit 4, Mich. Said to be adapted quickly and easily to change-overs, the machine features finger-tip operation which

GEM VISES

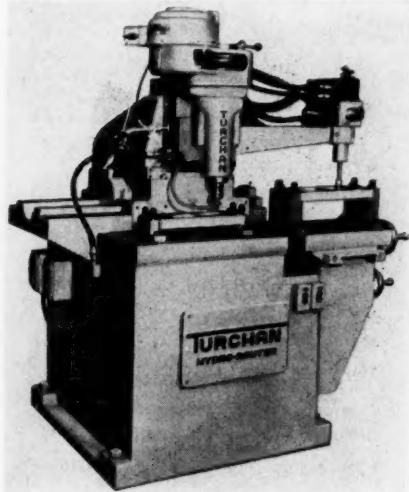


Made in a range of sizes and types, to handle most any kind of machining operation, where vises are applicable. Write for circular, etc.

J. E. MARTIN MACHINE WORKS, Springfield, Ohio

is accomplished through hydraulic tracer servo-control to provide easy and accurate positioning of the vertical spindle slide, ram, and ram slide. All hydraulic feeds are said to have infinitely variable feed rates with stepless automatic tracer control. The machine incorporates a stationary work table attached to a sturdy machine base and an adjustable master table with micrometer dial readings in 0.001-inch increments.

The table working surface of the



Turchan Model 1-24 Hydro-Router

machine is $32\frac{1}{4} \times 14\frac{1}{2}$ inches with a longitudinal range of 24 inches, a cross range of 12 inches, and a vertical range of 8 inches. Spindle speeds range from 900 to 3,600 r.p.m. Standard equipment includes three-dimensional tracer control; coolant tank with pump, motor, and piping; splash and chip guard; cutter adapter drawbar; hydraulic power unit; and complete motor controls. The machine can also be built to specifications to meet individual requirements.

October, 1953

**The Operator's Eye
is your most
vital control**



PROTECT IT WITH

VIMCO[®] Lights



No machine can be better than the eyes that guide it. Don't let them strain and fatigue under insufficient plant light . . . shadows . . . or glare.

You can make your machine completely **light independent** by installing Vimcolights. Vimcolights are the rugged, non-glare lights that have accompanied machine tools as original equipment since 1919.

Write for Bulletin 74.

See Better . . . Work Better

VIMCO MFG. CO., Inc.

Since 1919
111 Brayton St. Buffalo 13, N.Y.



**STANDARD DIMENSION
STUB SCREW MACHINE
REAMERS**

Finished blanks in stock: Sizes No. 00 to No. 23 to grind from .0600" to 1.0100". Tolerances unless otherwise specified plus or minus .0001".



**BUOL SPECIFICATION
STUB SCREW MACHINE
REAMERS**

For larger type Gridleys, Chucking Machines, Turret Lathes, and Hand Screw Machines. Also used extensively for second operation work.

Finished blanks in stock to grind from .0930" to 1.2500". Tolerances unless otherwise specified plus or minus .0001".



**SPECIALS
MADE TO ORDER
PROMPTLY**

Backed by 27 years of manufacturing experience on reamers exclusively, we also make Die Clearance Reamers, Helical Taper Pin Reamers, Carbide Tip Reamers, and Special Reamers to your blue print specifications and requirements.

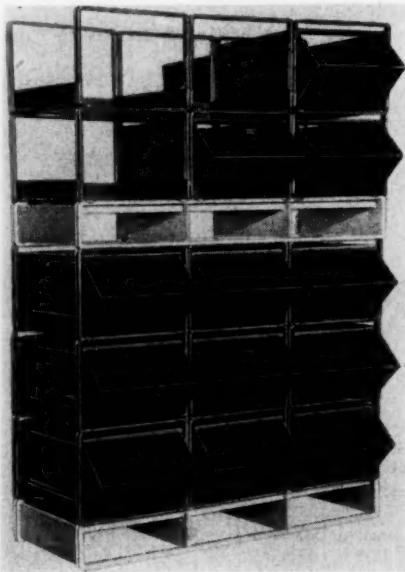
Write for bulletin giving full details.

MANUFACTURERS' AGENTS: A few exclusive territories still open. Write us.

THE BUOL MACHINE CO.
MEADOW & PARK STREETS
NEW BRITAIN, CONNECTICUT

Pallet Provides Fork Truck Handling of Parts and Materials

A double-faced pallet, specially designed for Stackrack assemblies, which permits fork truck handling of parts and materials has been announced by Stackbin Corp., 1083 Main St., Pawtucket, R. I. Made to fit Stackracks, into which Stackbins, tote pans, and boxes slide like drawers, the pallet is



Stackbin Palletized Unit

designed with adequate clearance for easy handling. The bottom of the pallet interlocks with the top of a Stackrack assembly so that palletized units can be safely stacked one above the other.

According to the manufacturer, the pallet improves the efficiency of the Stackbin system of parts storage and handling by eliminating one step in manual handling. The pallet is made of heavy-gauge channel and formed steel, strongly welded.

Air Motor Features Axial Piston Design

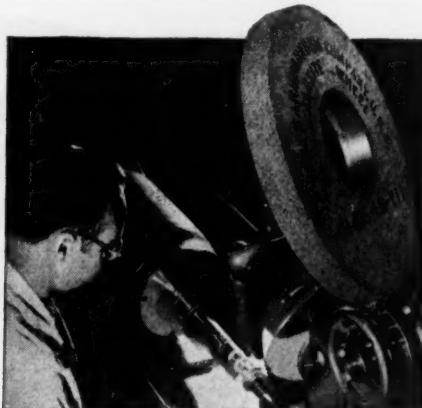
Designated as the Series 70A, an air motor which features an axial piston design that is said to result in low air consumption has been announced by Keller Tool Co., Grand Haven, Mich. Compact and instantly reversible, the motor is available in ratings from $\frac{1}{2}$ to $2\frac{3}{4}$ h.p., in 12 combinations of speed and torque to meet a wide variety of industrial applications. According to

the manufacturer, air consumption varies from 21 c.f.m. in the smallest model to 83 c.f.m. in the largest size motor. The motor is said to be ideal for applications such as valve closing, in agitators and tilting tables, and as a variable speed drive for overhead cranes.

The motor, it is claimed, provides continuously variable speed control from zero to full, plus freedom from spark hazard. Consistent torque out-

Use our CYLINDRICAL GRINDING WHEELS on your job!

... see proof that the right grinding wheel improves
quality... boosts production... cuts costs



Make an *on-the-job* comparison of CARBORUNDUM's cylindrical grinding wheels with the wheels you're using now. Compare them for speed and accuracy of cut... for cool cutting action... long wheel life... economy. Find out what the *right* grinding wheel by CARBORUNDUM does for you—on your plain, universal, or special-purpose cylindrical grinder.

HOW TO CHOOSE THE RIGHT WHEEL. Your CARBORUNDUM Salesman or Distributor is the man to call. He'll visit your plant, analyze each part of your cylindrical grinding operation—your machines... the material you're grinding... your tolerance and finish requirements... the production rate you're after. Then he'll recommend the *right* combination of abrasive grain, grade, structure and bond—all engineered by CARBORUNDUM into a precision grinding wheel designed to give you the exact results you're looking for... the wheel which will give you highest output at lowest cost.

MAKE THE TEST TODAY—DECIDE FOR YOURSELF! Call your CARBORUNDUM Distributor or Salesman. He's listed in the yellow pages under "Abrasives" or "Grinding Wheels." He's your best bet for experienced counsel... and for prompt delivery from complete stocks... for every grinding job you do.

Get this
helpful booklet
FREE!

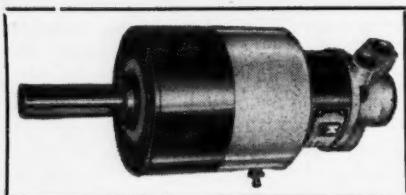
Write to Dept.
MM 81-321,
The Carborundum Co.,
Niagara Falls, N. Y.



CARBORUNDUM

REGISTERED TRADE MARK

... the ONLY source for EVERY abrasive product you need



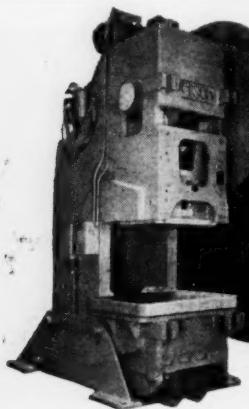
Keller Series 70A Air Motor

put is said to be achieved on low as well as on high pressure.

Complete Milling Cutter Line Uses Only Two Standard Blade Sizes

Millit, Inc., 55 Flint St., Rochester 8, N. Y., has announced the addition of "extended width" slotting cutters to its standard milling cutter line. A new stagger tooth method of mounting replaceable blades is said to allow the manufacturer to make any width cutter desired. Standard "A" size blades are used for cutters from $\frac{1}{2}$ to $\frac{3}{4}$ inch wide. All cutters over $\frac{3}{4}$ inch wide are made up using Millit's standard "B" size blade.

The new stagger tooth method

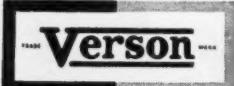


**VERSON O.B.I.'s
operate with
BIG PRESS
Accuracy and
Precision**

Verson O.B.I. presses combine high utility with the performance standards of big, expensive machines. They operate with accuracy and precision on a wider range of jobs than any other press. In addition, they are easily adaptable to high production set-ups.

As further proof of value, check these Verson features . . . heavy allsteel frame . . . machine cut steel gear and pinion . . . gears running in oil . . . mechanically interlocked pneumatic clutch and brake unit . . . full electric controls. Six models—capacities from 90 to 250 tons. For complete information, write today for bulletin O.B.I.-49.

A Verson Press for every job from 60 tons up.



9310 S. Kenwood Ave., Chicago 19, Ill.

**VERSON ALLSTEEL
PRESS CO.**

Se. Lumar at Ledbetter Dr., Dallas, Tex.

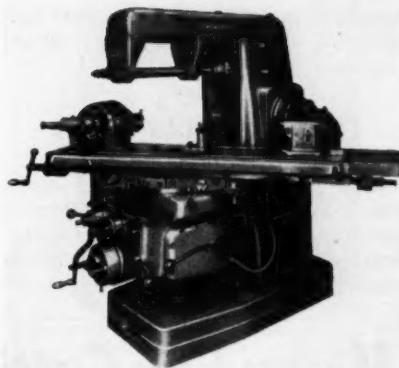
Millit Extended Width Slotting Cutter

of mounting across the width of the cutter body is said to avoid the use of long lengths of carbide, thus reducing tooth breakage to a minimum. Aside from stagger tooth slotting applications, the extended width cutter can also be used for heavy side milling where increased cutter width is desir-

able. Extended width cutters now available range from 4 to 14 inches in diameter and can be made up to any width over $\frac{1}{2}$ inch. Replaceable blades are available with high speed steel, cast alloy, or carbide tips.

Universal Milling Machine Features Rapid Traverse for All Directions

A dial-type high-speed universal milling machine which features rapid traverse, forward and reverse, for all directions has been announced by Graham Machine Tool Co., 19 Cleveland Place, New York 12, N. Y. The machine utilizes a No. 50 taper spindle which is said to allow interchange of cutting tools with all American millers. According to the manufacturer, the table has a wide range of speeds for automatic feeds up to 26 inches per minute, and rapid traverse rate is 71



Graham Dial-Type High-Speed Universal Milling Machine

inches per minute. Visual oil control is supplied for all moving parts and all controls are placed in front of the knee for easy access.

The machine is available in three



RUEMELIN FUME COLLECTORS KEEP SHOP CLEAR OF WELDING FUMES

This well ventilated welding department is typical of hundreds of similar installations. Welding operators appreciate smoke and gas-free atmosphere. Thousands in service. Many repeat orders. Collecting fumes at the source with local exhaust hoods has proven most practical in operation. It is particularly helpful in winter months when doors and windows are closed. Write for Bulletin 37-E describing all types of Ruemelin Fume Collectors.

RUEMELIN MFG. CO., 3996 NO. PALMER ST. • MILWAUKEE 12, WIS., U. S. A.
Mfrs. & Engrs. • Sand Blast & Dust Collecting Equipment

sizes. A heavy vertical attachment and universal dividing head are furnished as standard equipment.

Finishing Method Utilizes Dual Wheel

A finishing method comprising a dual wheel, designated as the Pensco, which consists of a 120-grit silicon carbide vitrified bond outer grinding wheel for dry-finishing grinding and a

phenolic resin diamond lap insert for diamond lapping has been developed by Penn Scientific Products Co., 5941 Alma St., Philadelphia 24, Pa. The lap insert of the wheel is impregnated with Spectrum diamond lapping compound (diamond paste) of the desired grit size, U. S. Standard No. 30 (600 grit) generally being preferred.

According to the manufacturer, the diamond lapping operation, completed in a matter of seconds, reduces the surface finish of the cutting edge from 15 to 20 r.m.s. after finish grinding to 1 to 2 r.m.s. after lapping. The

If you buy Cutting Tools



HERE'S
HELP
FOR
YOU!

TOOL BITS
END MILLS
MILLING CUTTERS
CUT-OFF BLADES
ALLOY CENTERS
SLITTING SAWS
INSERTED BLADE CUTTERS
WEAR PARTS
HIGH SPEED, CAST ALLOY, CARBIDE "SPECIALS"
ROLLS
ROTARY SHEARS



Pensco Dual Wheel

Do you buy or specify cutting tools and wear-resistant parts? You'll find this Gorham Tool Catalog a *helpful time saver!*

Its 120 pages are packed with useful cutting tool information . . . plus a valuable section of Engineering Data. Request your free copy on company letterhead. In special tooling problems, consult your nearby Gorham field engineer. His counsel is yours for the asking, and it's backed by Gorham's 35 years' experience in the design and production of fine cutting tools. Write for his name.

Gorham TOOL COMPANY
"EVERYTHING IN STANDARD AND SPECIAL CUTTING TOOLS"
14414 WOODROW WILSON • DETROIT 3, MICHIGAN
WEST COAST WAREHOUSE: 576 North Prairie Ave., Hawthorne 4, Calif.



wheel, suitable for use on practically all tool grinders, is supplied complete in a convenient kit which includes a 5-gram tube of Spectrum diamond lapping compound in any one of the 12 standard grit sizes and a 4-oz. bottle of diamond lapping oil with atomizer applicator and wheel charging roller.

Improved Air-Gage Tracer for Model EE Monarch Lathes

Incorporating a number of important design advances and performance improvements, an improved Type C Rigid Air-Gage Tracer, which supersedes the Type B tracer, has been developed for application to its Model EE sensitive precision toolmaker's lathe and Model EE precision manufacturing lathe by The Monarch Machine Tool Co., Sidney, Ohio. All model



Monarch Model EE Precision Manufacturing Lathe equipped with Type C Rigid Air-Gage Tracer

EE lathes equipped with the tracer are powered by an electronic drive, resulting in minimum vibration at all speeds due to the absence of rotating elements in the power supply to the drive motor. Maximum diameter change at one setting of the slide is 3 inches, and the feed range of the hydraulic slide, when set at 45 degrees, is said to allow square shoulders to be turned.

Another design feature is the mounting of the tool on its own slide, providing for the adjustment of diameter

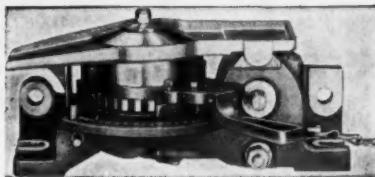


MAGNIFIES the "hard to read" vernier scales on calipers and height gauges. No more eye strain, guess work or hit or miss setting and reading. LENS is finest quality optical glass, specially designed and ground for the purpose with utmost optical skill. 4X magnification shows lines true and correct. In daily use in plants of Westinghouse, General Electric, General Motors, Chrysler, Packard, Ford, Boeing Aircraft, Bendix Aviation and many others engaged in defense work.

Made in 3 sizes to fit Starrett, Brown & Sharpe, Lufkin Tools, and others of similar design. S No. 100 for 6" Vernier Calipers; S No. 200 for 10"-12" Height Gages, also 10"-18"-24" Vernier Calipers; S No. 300 for most popular type 18" and 24" Height Gages and for 36"-48" and 60" Calipers.

For Complete Information Write, Phone or Wire
STEBAR COMPANY
711 W. Lake St. Minneapolis 8, Minn.

MODEL H AUTOMATIC Chucking & Indexing Fixture



1. 1800 light cuts per hour.
2. Either horizontal or vertical position.
3. Collets changed instantly.
4. Automatically knocks piece out.
5. Ratchet or degree indexing — degree indexing added later if desired. Capacity 1".
6. Automatic indexer also added later. Model F—Both degree and ratchet indexing Capacity up to 2 1/4".

Write for Folders

J. W. DEARBORN • Ansonia, Conn.

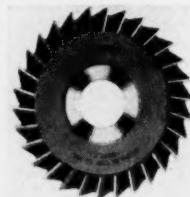
changes without altering the template or tracer setup. Either flat or round templates may be used with the tracer, the former often preferred for longer runs. With stylus pressure against the template amounting to only 5 or 6 oz., there is said to be no need to harden the template for wear resistance.

Air and oil lines of the tracer connecting it with the compact power unit, located at the rear of the cabinet

base, are short, and air at no less than 60-65 lb. pressure from a constant pressure source is required.

Circular Metal-Cutting Saw Is Suited for Difficult Work

Designated as "Circoloy," a circular metal-cutting saw which is said to be ideally suited for difficult work, as well as for regular cutting operations, has been announced by Circular Tool Co., Inc., 765 Alleen's Ave., Providence 5, R. I. According to the manufacturer, the saw is made of an



"Circoloy" Circular Metal-Cutting Saw

SEND FOR THIS FOLDER

And DATA SHEETS

IT'S THE LONG STROKE UNIT!

12" stroke on base only 16 $\frac{3}{8}$ " long. Or smaller model, 9" on 13 $\frac{3}{8}$ " base. LONG STROKE makes it easy to change tools. TRAVERSE RATE over 400" min., FEED RATE up to 30" min. CAPACITY $\frac{1}{2}$ " in steel. Self-contained, completely hydraulic. Unusually accurate and dependable. Especially adapted to use on transfer machines. For catalog-folder and data sheets, write DRILLUNIT, INC., 639 Mt. Elliott, Detroit 7, Mich.

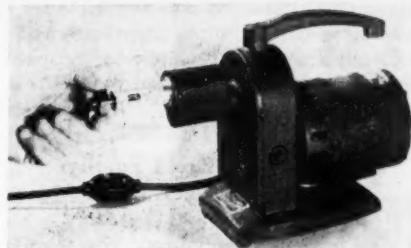
DRILLUNIT, INC.
639 Mt. Elliott Avenue
DETROIT 7, MICHIGAN

OPERATES WITH 7 METHODS
YOU KNOW AND TRUST

Unit Is Especially Designed for Bench Inspection of Threaded Products

The Taft-Peirce Mfg. Co., Woonsocket, R. I., has announced the Taft-Peirce Bench Model "Rotochek," an electrically-operated gage for checking internal threads by power instead of by manual rotation. The Rotochek has the gaging assembly mounted directly on the motor unit, and is especially designed for bench inspection of threaded products. Transfer of the entire unit from one location to another is facilitated by its lightweight construction and a convenient handle directly above the motor.

Work is brought to the unit, where a slight forward pressure causes the gaging member to screw into the part automatically at the rate of four revolutions per second. Reversal of applied pressure causes immediate disengagement or reversal of the drive, as de-



Taft-Peirce Bench Model "Rotochek"

sired. Torque control is provided by a unique clutch design, in order to eliminate any danger of damaging the parts inspected.

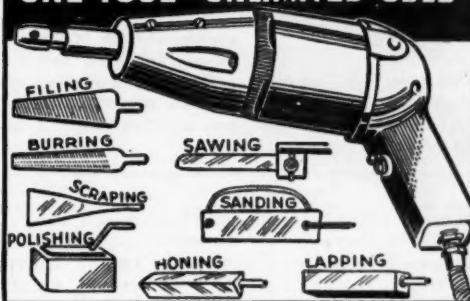
The standard spindle will accommodate A.G.D. tapers No. 00, No. 0, No. 1, and No. 2, covering a range of thread gages up to 0.510-inch nominal diameter. A slightly larger spindle assembly can be furnished to extend this range to include A.G.D. No. 3 tapers.

STOP...HAND WORK

Use these Handy PORTABLE, ELECTRIC RECIPROCATING TOOLS for Greater Production, Better, More Uniform Work—All with less Operator Fatigue. Fixed strokes are $\frac{1}{8}$ " or $\frac{3}{8}$ " long.

Operate on 110 Volts AC-DC. Deliver 1000 PUSH-PULL strokes per minute. Try one of these tools on your next job.

ONE TOOL - UNLIMITED USES



ACME TOOL COMPANY

73 WEST BROADWAY

NEW YORK 7, N. Y.

Special adapters are also available for reversible thread plug members and for adapting the Rotochek to inspection of externally threaded parts.



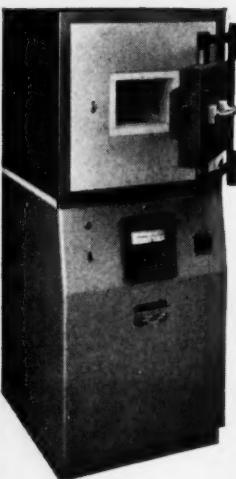
Rigid "One-Way" Stock Pusher

Feed Unit Provides Positive Push Against Stock

Designated as the "One-Way," a stock pusher, announced by Rigid

Products Co., P. O. Box 162, Dept. M, Cincinnati 15, Ohio, is designed so that when the pusher moves forward the friction of the bar on the split pads, plus the spring tension, causes the pads to wedge tight on the bar and provide a positive push against the stock. On the return stroke, the initial drag of the bar works against the spring, causing the pads to free so that the return stroke has a minimum of friction. According to the manufacturer, this action results in reduced pressure against the bar as the pads slide back across the bar, virtually eliminating scratching of the bar and assuring uniform work length.

Tension of the pusher is said to be easily adjustable and remains constant regardless of the spindle speed. The pusher, it is claimed, also affords reduced wear on the feed slide and drum cams of the machine.



• Write today for literature on complete line of Huppert furnaces and ovens in floor and table models.

A NEW FURNACE

WITH A 2 YEAR ELEMENT GUARANTEE

Range: 300° F. to 2,000° F.

HUPPERT

Model "K-R"

Electric Heat Treating

FURNACE

For Precision Production and Lab. Work

• This new Huppert Model "K-R" is ruggedly constructed to meet severest production requirements, yet offers a high degree of accuracy for laboratory experimentation. Complete with transformer, contactor, switch box, Huppert Infiltral and indicating electronic temperature controller. All connections factory installed. Shipped ready for operation.

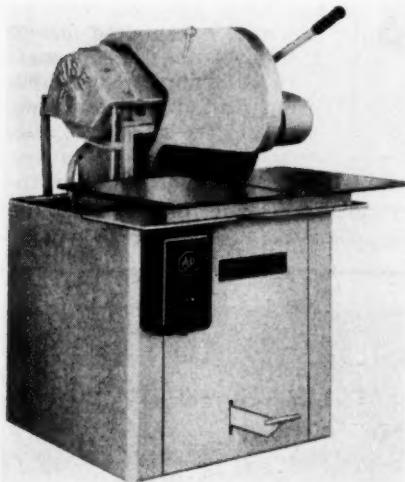
Model No.	Inside Dimensions			K.W.	Prices—Single Phase	
	Wide	High	Deep		220 volt	440 volt
K-R 668	6"	6"	9"	2	\$ 710.00	\$ 770.00
K-R 6613	6"	6"	13"	3.5	800.00	860.00
K-R 8613	8"	6"	13"	5	990.00	1,050.00
K-R 10813	10"	8"	13"	8	1,240.00	1,370.00
K-R 10818	10"	8"	18"	12	1,450.00	1,580.00

K. H. HUPPERT CO. 6841 Cottage Grove Avenue,
Chicago 37, Illinois

• Manufacturers of Electric Furnaces and Ovens •

Cut-Off Machine Can Be Adapted to Gate and Riser Cutting

Henry H. Wise Co., 945 Wilshire Blvd., Los Angeles 17, Calif., has announced a cut-off machine which, by simply attaching the foundry bed, locking the cutting head, and removing the handle, is adapted to gate and riser cutting. By reversing this procedure, the machine is said to revert to a chop-stroke operation for cutting bars and shapes. Powered by either a



Wise Cut-Off Machine

7½ or 15-h.p. motor to permit the use of 18 and 20-inch cut-off wheels, the machine features a large throat which is afforded by hinging the cutting head on the motor's end bells to provide work space for large castings.

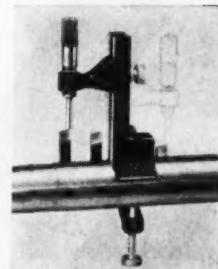
When used as a chop-stroke machine, a safety guard covers the entire wheel before the cut starts. The safety guard can be locked in any desired position. A heavy-duty foot-operated V-vise hold-down for cutting bars, shapes, and pipes is also incorporated in the machine.

SAVE TIME

With

Bartelt

Gages



• Use a Bartelt Pedestal Micrometer for setting boring tools and for many other shop operations requiring accurate positioning relative to a fixed base. Make settings in one step — eliminate cut-and-try methods. Model B, with reversible slide, shown. Write for literature describing all models.

BARTELT ENGINEERING CO.
1216 PARTRIDGE AVE.
BELOIT • WISCONSIN

Cut Costs on Hole-Cutting! USE THE NEW . . . BOREMASTER

Finished holes
1½" to 11¾"
diameter to a
depth of 8" in
one rapid op-
eration on your
present equip-
ment!



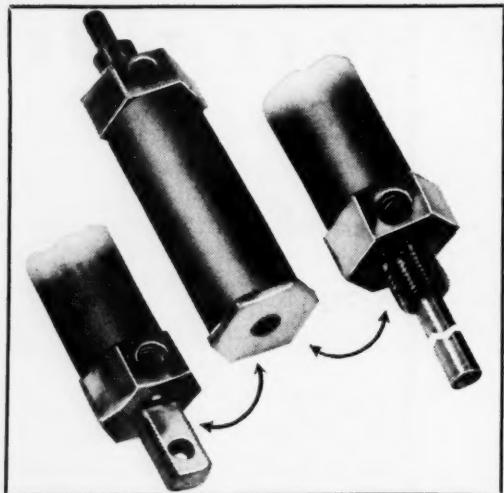
BOREMASTER is not just another Trepanning Cutter, but a real heavy duty tool. Stock is removed in one piece eliminating waste. Remember . . .

TIME SAVINGS + MATERIAL SAVINGS
= COST SAVINGS

• Write us today for complete details!

KARL A. NEISE

Mastertools for Modernized Machining
404 4th Ave., Dept. MMS, New York 16, N. Y.



Magicair "Studmount" 1 1/8-Inch Cylinders

threaded nose on either end and which is designed for 300-p.s.i. hydraulic or pneumatic service has been announced by Magicair Division, Pneumatic Products, Inc., Hamden, Conn. The cylinder may be mounted in stud form without the use of mounting brackets, jigs, or fixtures; however, a complete line of foot, pivot, and flange mountings is available as extra equipment. The mounting brackets are said to be fully interchangeable.

According to the manufacturer, the cylinder is compact in size and is unhampered by tie rods. The cylinder

Cylinder Features Threaded Nose

Designated as the "Studmount," a 1 1/8-inch cylinder which features a

PROSSER CARBIDE TOOLS

FOR ALL YOUR PRACTICAL NEEDS

• ADVANTAGES

- 1. Quick-acting indexing tables give more work per minute.
- 2. Wet grinding eliminates heat-causing dry work — gives longer, more effective grinding.
- 3. Greater economy — more work per cutting operation.
- 4. Versatility — for all grinding, cutting, drilling, sawing, and other operations.
- 5. Moderate-priced — money-saving.

← Model AW Wet Grinder

New indexing and wet grinding with coolant pump — all in one unit.

WHITE HORSE DRILLING

THOMAS PROSSER

114 WALL STREET NEW YORK 4, N.Y.

can be furnished in double-ended rod models, and all materials are said to be corrosion and rust-free. The cylinder, it is claimed, can be used for vacuum or water service.

High Speed Attachment for Flexible Shaft Machines

The N. A. Strand Division of Franklin Balmar Corp., Woodberry, Baltimore 11, Md., has introduced a high speed attachment for its Strand flexible shaft machines that increases spindle speeds to three times the rated speed of the motor. Designed primarily for use with carbide rotary files and cutters, as well as high speed steel tools, the attachment clamps onto the flexible shaft machine motor in the same manner as a standard flexible shaft. The step-up gears are built into the attachment rather than the handpiece; thus, the handpiece is lightweight and a small shafting of greater flexibility can be used. Because the gears are in the attachment, the handpiece is easier to control during precision work.

When fitted to

a Strandflex 4-Speed Gear-Drive Flexible Shaft Machine, the high speed attachment is said to provide users with a choice of eight spindle speeds—the basic four speeds of the machine with a standard shaft plus four more with the attachment. Top speeds are said to range from 13,500 to 36,000 r.p.m., depending on which Strandflex unit is used with the at-

NELCO CARBIDE TIPPED SLAB MILLS



Machine Army Automatic Rifle Receivers in 1/5th the time . . . to better finishes . . . with 30 times more pieces per grind than conventional cutters!

An amazing story, but TRUE! Working on tough, scaly Perlitic Malleable iron castings, Nelco carbide tipped slab mills took a healthy .100-.125 bite—a full 3½ inches wide—on a 3 horsepower machine at the incredible feed of 11½ inches per minute! Not only did the Nelco slab mills surpass conventional cutters in speed, but produced better finishes, 400% more production per machine!

SET NEW PRODUCTION Records!

HERE ARE ACTUAL PRODUCTION FACTS

	High Speed Steel slab mill 80 RPM	Nelco carbide tipped slab mill 410 RPM
Feed (in/min.)	13½	11½
Production per machine	6 pcs. per hour	29 pcs. per hour
No. of pieces per grind	8	250 (Average)
Finish	Wavy—needed extensive polishing	Superior machine finish

This example is typical of the time-saving, money-saving benefits users report when using Nelco carbide tools. With nearly 800 tools regularly stocked, you can order—and GET—"special" tools at standard prices. For full information on the complete Nelco line, send today for 48 page catalog.

NELCO TOOLS

NELCO TOOL COMPANY, INC., MANCHESTER, CONNECTICUT

For that Extra
EDGE in Production

tachment. The attachment can be fitted to standard Strand units, as well as the Strandflex.

Heavy-Duty Etcher Has a Wide Range of Heats

Designated as the Model A-A, a heavy-duty electric etcher which has a wide range of heats, thus making it suitable for use on small parts or for marking large pieces, has been an-

ALL MACHINISTS!

There are days when every machinist finds himself in trouble with a tough machining job—yet the solution is easily available.

"MACHINE SHOP TOOLING" is guaranteed to be the most complete, useful book of factual machining data ever published, covering ALL materials, operations, and machine tools. Revolutionary alphabetical sequence.

You will find this new machining guide invaluable. Its 342 pages are crammed with data necessary to do any job right. 99 1/2% of all who send for it, keep it, because there has never been anything like it.

\$3.00 will bring your copy postpaid; or we will mail a copy for examination and bill you 25¢ extra for bookkeeping expense. Either way, you may return it for full credit if not completely satisfied.

The finest machine is only as good as its tooling!

WILCO PRESS Dept. M-7, 3326 N. Bailey St.
Philadelphia 29, Pennsylvania

nounced by The Martindale Electric Co., 1375 Hird Ave., Cleveland 7, Ohio. According to the manufacturer, six



Martindale Model A-A Heavy-Duty Electric Etcher

heats provide 180, 310, 425, 550, 800, and 1,375 watts respectively. As these heats are all taken from taps on the secondary winding, the full primary winding is always in the circuit; therefore, the etcher may be left connected to the line without danger of overheating when not in use. The etcher incorporates a pilot light and "on" and "off" switch.

The unit is supplied in a heavy-gauge case which has a storage compartment to house all cables and parts.

349 MIDLAND AVENUE • DETROIT 3, MICHIGAN

Adjustable Wrench Features Jaws That Can be Locked at Any Setting

Designated as the No. 92, an adjustable wrench which features jaws that can be locked rigid at any setting and which acts as a vise-wrench exerting a 100-lb. grip on the bolt or machine component to which it is fastened has been announced by Utica Drop Forge & Tool Corp., Utica 4, N. Y. The wrench incorporates a lever about 3 inches long which snaps over the handle. The lever, which operates on a knurl, controls the jaw locking and unlocking action.

In use, the wrench is set to any desired opening either by adjusting the wrench lightly on the work or by setting the jaws by a ruler for the correct opening. A light push on the lever locks the adjustment. A slight push on the button at the opposite end of the lever is said to instantly release it. When used as a vise-wrench, the lever is moved out until the "clutch" mechanism engages the knurl. A slight clockwise turn of the lever is said to squeeze the jaws together vise-tight.



Utica No. 92 Locking Wrench

The Utica No. 92 Locking Wrench is available in 8, 10, and 12-inch sizes and is made of fine alloy steel with hardened jaws.

Now...From one outstanding source!

**All Your
Diamond
Abrasive
Requirements**

**THE
Star Dust
LINE!**

**A COMPLETE RANGE OF
LABORATORY GRADED DIAMOND
ABRASIVES FOR EVERY PURPOSE**



STAR DUST DIAMOND WHEELS AND HONES

Superior diamond quality combined with new bonding formula.



STAR DUST Laboratory graded Pure Diamond Powders



STAR DUST Laboratory graded diamond lapping compounds in 18 gram applicator gun—or in 5 gram ophthalmic tipped tube.

You can put your confidence in the STAR DUST line as so many others do because STAR DUST quality is consistent quality—the result of our special process of laboratory crushing and grading to achieve uniform nodular shape. That means *all* particles work for you. Be "Laps Ahead." For easier grinding and mirror finishes specify STAR DUST products.

For complete information and catalog write Dept. B-11.

STAR DUST LABORATORIES
100 EAST 42nd STREET - NEW YORK 17, N.Y.

Bearings Provide Means for Adjusting Ball Race

A line of spherical bearings and spherical rod end bearings available in different sizes and types to cover many applications has been introduced by Lincoln Park Industries, Inc., 1719 Ferris Ave., Lincoln Park 25, Mich. These products, known as Adjusta-Ball Bearings, provide a means for adjusting the ball race to provide thoroughly accurate positioning of the

bearing. This feature, it is claimed, not only assures maximum correction of misalignment but also an unusually long service life of the bearing since proper adjustments can always be made to compensate for wear.

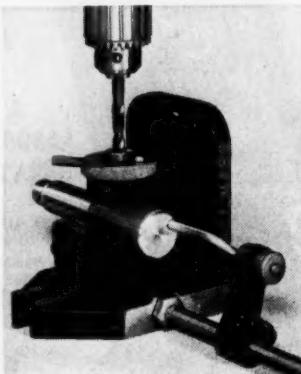
Each bearing race insert is so designed that it may be adjusted to any desired degree of relationship to the ball. By the use of a spanner wrench inserted in the notches on the outer edge, the race can be tightened or loosened,

with a one notch adjustment being slightly less than 0.001 inch. Once the adjustment is made, the bearing race inserts are locked firmly in position by means of a set screw inserted through the notch which is at the bottom position. The inserts are made of Mueller 600 bronze and the ball is made of S.A.E. 52-100 steel, hardened and chrome plated.

All Adjusta-Ball Bearings are pre-lubricated. Lubrication is supplied through the stem in rod end bearings and through lubrication holes in the spherical bearings. An opening between the two bearing race inserts acts as a reservoir to provide an ade-

NEW ADJUSTABLE DRILL JIG eliminates layout; cuts drilling time

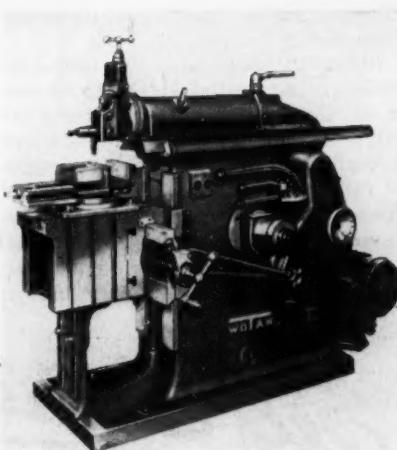
Used for drilling holes through round stock and hex stock from $\frac{1}{4}$ " to 2" and cap screws from $\frac{1}{4}$ " to $1\frac{1}{4}$ ", the new Mathewson Adjustable Drill Jig eliminates layout and can cut drilling time on small lots to a fraction. And it eliminates the costs of special jigs for larger quantities. Holes for cotter pins, set screws, drive pins for bayonet joints, oil holes in tubular sections, and wiring holes in cap screws, are all typical of the operation that can be done more economically with this jig. Hole diameters range from .052" to .531", using your A.S.A. standard slip bushings. The hardened V-block has two 60-degree V's for centering round or hexagonal stock, one for $\frac{1}{4}$ " to $21/32$ " diameter, one for $21/32$ " to 2" diameter. Adjustable stop for locating work longitudinally for drilling any distance from end, may be used on either side. Adjustable bushing carriers hold slip bushings and clamp work securely. Jig highly successful in permitting use of inexperienced drill operators. For circular write to: **Mathewson Machine Works, 36 Hancock St., Quincy, Mass.**



quate supply of lubricant at all times. When specified, the bearings can be supplied with seals to hold the lubrication in the body of the bearings.

Shaper Is Available with Plain or Universal Table

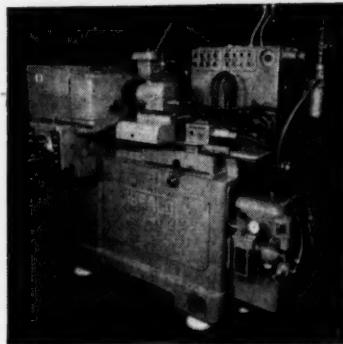
The "Wotan" No. 22 Precision V-Ram Shaper which is available with either a plain or universal table and which is said to be well suited for toolroom and production work is now being distributed by Parker Machine Co., Inc., 158 Pioneer St., Brooklyn 31, N. Y. Powered by a 5-h.p. motor, the machine, it is claimed, has eight ram speeds between 12 and 132 strokes per minute that are obtained by the shifting of two levers. The engaged speed can be read by a conveniently located speed indicator. Sliding gears and spline shafts are ground and operate in an oil bath in a totally-enclosed



"Wotan" No. 22 Precision V-Ram Shaper

gearbox. Power feed to the table is said to operate in both directions at rates of from 0.01 to 0.04 inch per stroke. Power downfeed to the tool-

PROTECT THE ACCURACY of YOUR MACHINES WITH New, Leveling Barrymounts



For further information, write, wire,
or telephone

When chatter marks spoil your finishes, vibration from an outside source may be to blame. It may come from punch presses in another part of your plant, or it may come from passing traffic or from heavy machinery next door.

But building-borne vibration can't destroy the accuracy of your grinders if you set them on the new Leveling Barrymounts.

They isolate your precision grinders from building-borne vibrations that can cause chatter marks.

They absorb vibrations that destroy precise machine adjustments.

They keep shock and vibration from causing inconsistent operation of delicate controls.

Barrymounts cut your costs by stopping spoilage due to vibration. They're low in cost—and backed by a money-back performance guarantee. Just tell us the make and model of your grinders and we'll tell you how to protect their precision. And write for bulletin showing the additional advantages of these cost-cutting Leveling Barrymounts.

THE BARRY CORPORATION, 783 Pleasant Street, Watertown 72, Mass.

slide and an automatic tool lifter are available.

Both the plain and the universal table are supported at the front end in all directions. A tilting top plate can be supplied for either type of table. According to the manufacturer, length of ram stroke, as well as position of stroke, can be changed while the machine is in operation. All vital lubricating points are automatically lubricated by a built-in oil pump.

Self Service

Just pull out the shim stocks needed and snip off! Always ready for use — space saving — no waste. Free dispenser holds four rolls of brass or steel shim stock in sizes you want, .001" to .010", six inches wide and 100" long.

LAMINATED SHIMS:
Look like solid brass, yet
PEEL for adjustment.

**Sold by
America's Leading
Industrial
Distributors**



Improved Dehumidifier Is Designed for Compressed Air

Van Products Co., 3770 12th St., Erie 2, Pa., has announced several improvements in its Vi-Speed Dehumidifier, a self-cleaning device that purifies compressed air and reduces humidity to a low dew point. The improvements include a self adjusting nozzle coupled with a non-clogging aspirator which is said to stabilize unit operation during variable air pressures.

and provides for constant removal of injurious liquids, solids, and vaporous contaminants. The baffle



**Vi-Speed Improved
Model 200 Dehumidi-
fier and Filter**

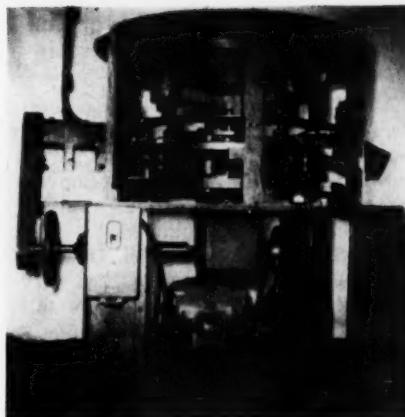
surfaces of the filter have been enlarged and repositioned for (a) greater exposure of contaminants to the action of "Dryolite," a potent drying agent that captures elusive vapors, (b) larger area for separation of heavy impurities, and (c)

better accommodation of momentary overloads.

According to the manufacturer, the unit is safe in flammable areas and is adaptable for processing compressed air under conditions that vary from normal building temperatures to frigid readings where air is used out-of-doors. The exterior of the dehumidifier has been streamlined for appearance, strength, and safety.

Beading Machine Is Suitable for Thread Rolling or Contour Forming

A beading machine which is said to be suitable for thread rolling or contour forming on shallow containers or bands, such as screw necks and caps, has been announced by Steiner Machine Co., 1014 Washington St. Hoboken, N. J. The high speed machine features four spindles and has up to a 51-inch diameter work capacity.



Steiner Beading Machine

Spring-loaded pressure control is said to afford long tool life. The machine utilizes an all rotary motion inexpensive tooling. It features rugged construction and is ball bearing equipped.

Any Temperature Between 325° and 1800° Maintained Accurately

HUPPERT

Model 2 DeLuxe FURNACE

You couldn't ask for a more dependable furnace for small unit production requiring continuous operation and long hard usage. Accurate control assures you of constant temperatures between 325° and 1800° F... always. I.D. 4 1/4" x 3 3/8" x 4 3/4". 110 Volt A. C. Current Consumption 900 Watts.

OTHER MODELS				
	I.D.	Temp. Range	Wattage	PRICE All Steel
Model No. 22 DL	4 1/4" x 3 3/8" x 9"	325°-1800° F	1600	\$110.00
Model No. 4 DL	4 1/4" x 3 3/8" x 6"	250°-1800° F	1600	110.00
Model No. 5 DL	4 1/4" x 3 3/8" x 9"	300°-1900° F	1750	172.00
Model No. 9A DL	6" x 6" x 6"	250°-1900° F	2000	200.00
Model No. 669 DL	6" x 6" x 9"	300°-1900° F	2500	248.00
Model No. 10 DL	8" x 4" x 6"	250°-1900° F	2000	215.00

(Also available in stainless steel at slight additional cost)

Write for catalog, illustrating and describing other models

K. H. HUPPERT CO.

Manufacturers of Electric Furnaces and Ovens

6841 Cottage Grove Ave.
Chicago 37, Illinois

\$80.00

All Steel
Construction

\$95.00

Stainless Steel
Construction

Air-Operated Screw Driver and Nut Setter Features Reversible Motor

A lightweight air-operated reversible screw driver and nut setter which features a reversible motor to permit the tool to be used for removing threaded fasteners as well as applying them has been announced by Thor Power Tool Co., Aurora, Ill. Designed for speeding inspection, testing, service, and repair of assembled products,

the tool is available in four basic speeds ranging from 574 to 2,000 r.p.m. The tool can also be furnished with either



Thor Reversible Air-Operated Screw Driver and Nut Setter

today's
wonder drug
for industry

Saves up to 95% of FINISHING COSTS on almost all types of parts!



Write for NEW, FREE 52-page catalog,
"SUPERSHEEN SPEED FINISHING."
Gives complete story with "before and after" photos.

Dept. K-10

ALMCO Supersheen

AMERICA'S LARGEST MANUFACTURER OF ADVANCED BARREL FINISHING EQUIPMENT - MATERIALS AND COMPOUNDS
ALBERT LEA, MINNESOTA

a slip clutch (for exacting tension control), a positive clutch (manual control), or a 25 per cent slip clutch drive. Either lever or pistol-type throttles can be supplied. The tool weighs only 2 pounds.

Tool Simultaneously Deburr and Chamfers Both Front and Back Faces of Holes

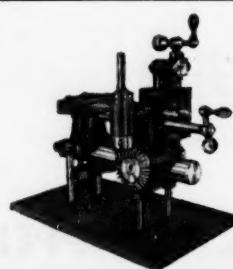
Designated as the "Noburmatic," an automatic deburring tool which is said to make possible the simultaneous deburring and chamfering of both front and back faces of holes in sheet metal, plate, extrusions, castings, and forg-

BURR Midget Portable KEYSEATERS

Hand, Drill or Motor drive to handle shafts up to 2 1/2" for cutting Woodruff and Straight keyways. Light weight for field work. Other series up to 12" shaft capacity.

Write for details.

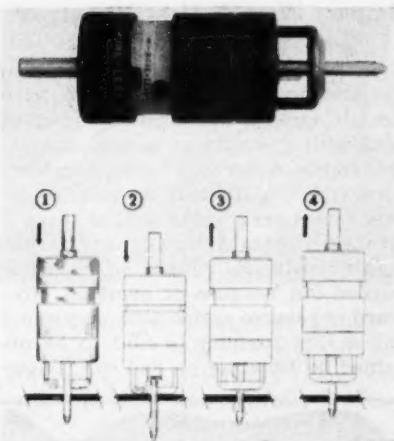
JOHN T. BURR & SON, INC.
429 KENT AVENUE BROOKLYN 11, NEW YORK



ings has been announced by Nobur Mfg. Co., 717 N. Victory Blvd., Burbank, Calif. According to the manufacturer, the high-speed tool produces uniform quality deburring with consistent accuracy and is ideally suited for use in portable drill motors or in stationary machine tools, such as drill presses and turret lathes.

The automatic action of the tool is said to debur the front face of the metal during the entry of the tool in the hole. The rear side is deburred during the withdrawal cycle. Independent controls are provided for setting of working depth of both front and rear cutters.

The tool is available in two models; namely, Model GCN for non-ferrous metals and other relatively soft materials, and Model GCF for ferrous metals and relatively tough working materials. Standard models can be supplied in individual tool sizes corresponding to drill gauges from $\frac{1}{8}$ -inch



"Noburmatic" Automatic Deburring Tool

diameter (0.0125) to "F" (0.275). Intermediate size tools between $\frac{1}{8}$ and $\frac{1}{4}$ -inch hole sizes can also be furnished.

NEW IMPROVED HAND SCRAPERS

with just the correct spring

and other features
never before incorporated
in any hand scraper

FASTER CUTTING



EASIER TO USE

This new Hand Scraper, Model No. 5, is the most improved tool of its kind ever produced. Light in weight, easier to use with palm fitting comfort grip, faster cutting. Rubber handle swivel pad, at small

extra cost, for those who place scraper handle against body for extra leverage. Three sizes: 18"-20"-22" long. Furnished with high speed steel or Carbo-loy Blades. Cost less than home made scrapers.



Write for Bulletin No. 10-22
ANDERSON BROS. MFG. CO., Rockford, Ill.
*Balancing Ways, Roto Checkers, Hand and Power Scrapers,
Spotters, Hand and Power Hydraulic Straightening Presses.*

Impact Wrench Uses Variety of Sockets and Attachments

Snap-on Tools Corp., Kenosha, Wis., has announced a $\frac{1}{2}$ -inch square drive electric impact wrench which can be used with a variety of sockets and attachments. According to the manufacturer, the tool delivers up to 2,000 rotary blows per minute and, as there is no direct connection, the motor runs continuously and cannot be stalled or burned out because of overload. Forward or reverse action with or without the motor running is said to be obtained by twisting an end cap. Plane-



Snap-on $\frac{1}{2}$ -Inch Square Drive Electric Impact Wrench in use

tary reduction gearing is used for reducing motor speed and all the teeth are induction hardened.

The overall length of the tool is $10\frac{1}{2}$ inches, with a maximum diameter of $3\frac{1}{16}$ inches. Two models are available; namely, one for 115 and one for 220-volt operation.

KENNAMETAL CUTTING TOOLS for Increased Productivity



KENNAMETAL Inc. LATROBE, PA.
CEMENTED CARBIDE TOOLS,
BLANKS, MILLING CUTTERS

Get a better "SURFACE GRINDER" job at less cost

ORDER DIRECT on our 10 day money back guarantee

RADIUS DRESSER \$39.00

Diamond \$7.00



Hardened shaft—Bearing adjustable for wear.
Diamond always perfectly centered.
Easily set adjustable 180° stops.

10" Wheel size for DoALL and NORTON
Grinders—\$44.00. Diamond \$7.00.

SPECIAL 20" Wheel Size \$110.00.

ANGLE DRESSER \$44.00

Diamond \$7.00



Ball Thrust
Bearing. 24
Precision Ground Surfaces. Can be set
very accurately with a Protractor or Sine
Bar. Works underneath the wheel. Large
bearing surfaces.

THE "MIGHTY MIDGET" LINE

SPERMAN METAL SPECIALTIES • 2199 E. 21ST ST. • BROOKLYN 29, N. Y.

Electric Handtool Utilizes Tungsten Carbide Midget Mills

Precise Products Co., 1345 Clark St., Racine, Wis., has announced a mountable electric handtool, designated as the Super 30, which is said to provide sufficient speed, power, and precision to utilize tungsten carbide midget mills, as well as other rotary tools, for grinding, milling, finishing, and polishing within a range from 3/32 to 3/16 inch in shank diameter. Driven by a 1/5-h.p. universal motor, the one-piece balanced spindle is said to be capable of turning 45,000 r.p.m. and can be reduced in stages to 15,000 r.p.m. by means of a speed control. The spindle operates on two micro-precision ball bearings with sealed-in lubricant. The tool is air cooled and vibrationless.

The tool incorporates an aluminum alloy housing which is shaped and balanced for easy handling and weighs 35



Precise Super 30 Electric Handtool

oz. Wheel arbors are available for precision internal grinding and milling with rotary tools, such as unmounted grinding wheels or tungsten carbide micro mills. All mounting surfaces are precision machined to ensure accurate concentric mounting on standard lathes, milling machines, drill presses, and other machine tools.



FREE SAMPLE

... for the sharpest carbide tools you've ever had !!

Now you can try amazing STADOIL for your diamond wheels —without cost! You'll get the same precision tool finishes already acclaimed by the more than 6,500 present users. Your diamond wheel manufacturer highly recommends STADOIL to remove gum or glaze and keep wheels from loading. One 8 ounce sample can will prove all we say about STADOIL ... so clip the coupon and ORDER SAMPLE TODAY.

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Please send postpaid the 8 ounce FREE SAMPLE of STADOIL.

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Company.

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Distributor.

STADOIL MANUFACTURING CO., EL MONTE 3, CALIF. U.S.A.

Air Draw Furnace Provides Temperature up to 1,350 Degrees Fahrenheit

Designed for use in laboratories, pilot plants, and industry for critical heat treatment of steel and alloys, an automatic recirculating air draw furnace with a temperature range of from 300 to 1,350 deg. F. has been announced by Blue M Electric Co., 306-308 W. 69th St., Chicago 21, Ill. The furnace

features guided air flow circulation to provide uniform heat treatment of the specimen.

A rear wall mounted air impeller circulates air in sufficient volume and velocity along both sides of the furnace, between the Modella heater banks and radiant heat shields, toward the door seal face, thus preventing any cold air inlet leakage.

The inner chamber is constructed of stainless steel alloy, and the outer housing is of heavy-gauge reinforced steel and angle iron. The furnace is insulated with triple side walls, 6 inches of high-temperature



* Ratchet motion with slight travel of lever.

Not an ordinary wrench! But a new type of tool that also provides powerful ratchet action in either direction without changing your hand grip. A flip of the ratcheting clip converts tool to a standard Knu-Vise Wrench. Thus you really have two wrenches in one. And what a very useful tool you will have!

Model RVW-7 has effective grip of 13/16" max.

Model RVW-10 has effective grip of 1-3/16" max.

**KNU-VISE
PRODUCTS** **LAPEER MFG. CO.**
3048 DAVISON ROAD • LAPEER, MICHIGAN

WESTERN DIVISION—422 MAGNOLIA
CANADIAN DIVISION—HIGGINSON ENGR.

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• HAMILTON, ONT.



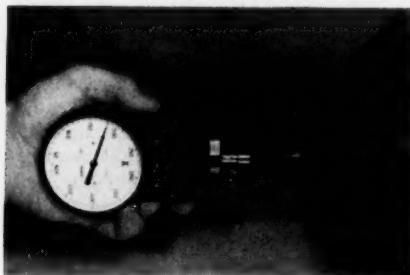
Blue M Automatic Recirculating Air Draw Furnace

fire-brick and Therm-O-Block.

Two standard models with a voltage of 230 or 440 volts, either single or three phase, are available.

Portable Instrument Instantaneously Checks R.P.M.

A portable instrument which is designed to instantaneously check the re-



Montgomery Portable R.P.M. Checker in use

volutions per minute of motors, machinery, revolving shafts, and so on, has been announced by Montgomery & Co., Inc., No. 7 Tichenor Lane on Mc-

Carter Highway, Newark 5, N. J. According to the manufacturer, the instrument is applicable wherever motors or machinery is used.

In operation, the rubber tip of the instrument is pressed against the revolving part to be checked, and the r.p.m. reading can be instantly read off the dial. The unit can determine a minimum speed of 40 r.p.m. and a maximum speed of 50,000 r.p.m. The housing of the instrument is metal with a black crackle finish, and the unit is supplied in a leatherette case.

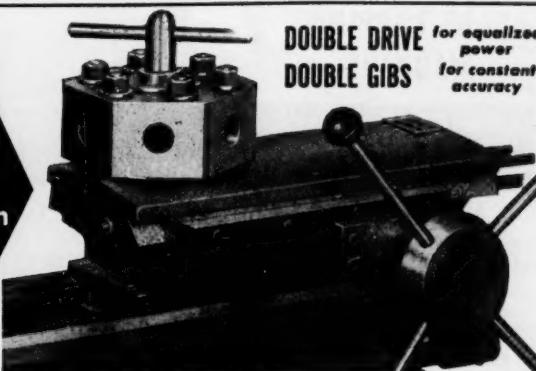
Tool Provides for 60-Degree Threading Close to Shoulder

Included in the line of standard carbide-tipped tools produced by Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich., is an off-center threading tool,

Enco
Self-Indexing
HEXTURRET
For Lower Production
Costs and Speedier
Output

- ✓ Custom built to fit all lathes from 9" to 18".
- ✓ Smooth, sensitive control with Pilot wheel drive through twin gears and racks.
- ✓ All bearing surfaces hand scraped.
- ✓ All parts of indexing mechanism hardened, assuring accuracy.

Manufacturers of the most complete line of Hexturret Bed Turrets, Turret Tool Posts and Tail Stock Turrets in the country.
Send for Catalog No. 53.



ENCO Manufacturing Co., Dept. 1103

4524 W. FULLERTON AVE., CHICAGO 39, ILL.

Reasonable Deliveries



Super Type ETS Off-Center Threading Tool

identified as the Type ETS, which is said to provide for 60-degree threading of work close to the shoulder. The

Type ETS Off-Center Threading Tool is available in seven sizes from $\frac{1}{16}$ to $\frac{3}{4}$ -inch shank.

Special Drill Head Features 16 Spindles and Straight-in-Line Drive

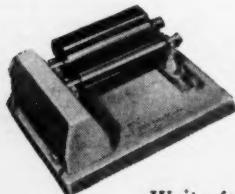
Thriftmaster Products Corp., 1002 N. Plum St., Lancaster, Pa., has announced a special 16-spindle, straight-in-line drive, adjustable drill head which is designed to meet an unusual customer requirement. The drill head was originally built to provide multiple drilling of a se-

Announcing

the NEW 24 inch SPITFIRE FLAT LAPING MACHINE

**LOW COST
PRECISION LAPING
AT PRODUCTION SPEED**

A NEW, large size Flat Lapping Machine of improved design for precision lapping of any material where a perfectly flat surface is necessary. Extremely close tolerance finishes are possible. An ideal machine for producing mating surfaces of sliding and rotating parts of air and liquid tight seals, plastic and die casting molds.



SPITFIRE ROLLER LAPING MACHINE

For lapping cylinders to accurate, mirror-like finishes in less time than any other method. Saves up to $\frac{3}{4}$ time in lapping.

Write for Brochures, Prices and Delivery

SPITFIRE TOOL COMPANY
2934 N. Pulaski Rd.

Chicago 41, Ill.

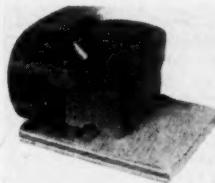


Thriftmaster 16-Spindle, Straight-in-Line Adjustable Drill Head

ries of trowel handles having in-line holes with varying centers. The head, with a spindle range of adjustment within a $1\frac{1}{2}$ -inch radius of their respective driving points, has a $\frac{1}{4}$ -inch drilling capacity in cast iron. The drill head is available in standard models, as well as in special variations.

SNYDER Deburr Machine

Especially built to remove the sharp torn edge on that hole you just drilled or punched, size 1/16" to 1 1/2" dia. A big time saver for fabricators and tool shops. Releases more expensive machines, used on these operations.



Finished Part

Patent Applied For

Provides a smooth and chamfered surface with little effort for the operator.

Measures only 7" wide x 9" long x 5" high. Uses standard commercial burr cutters. Motor not included. Weight, 18 1/2 lbs.

Territories available for distributors.

SNYDER
MANUFACTURING COMPANY
EAST DETROIT • MICHIGAN

R E I D

TOOL ROOM ACCESSORIES

C.I. HAND WHEELS



DISHED



STRAIGHT

SOLID WEB HAND WHEELS



Made of fine grain cast iron. Center hole and faces of hub are true to rim. High quality. Many sizes. Low prices.

COUNTER BALANCED HAND WHEELS

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NEW 44 Pg.
CAT.

REID TOOL SUPPLY CO.

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October, 1953

lightweight powerful

Mall

production
boosters

Model 143S Electric Screwdriver. Capacity: 1/4" hex bit—No. 10 flat, No. 12 round head screws. \$65.00



Model 146

Electric Drill. Choice of seven speeds to meet all production requirements. Capacity: 1/4" in steel, 1/2" in wood. Top quality built throughout. \$46.00

You're sure to find the EXACT MALL TOOLS you need to help BOOST PRODUCTION . . . from among the great many different styles and sizes in the MALL TOOL line. The name MALL on any tool you buy is your assurance of lasting dependability. Mail this coupon today.

40 Factory-Owned Service Warehouses, Coast-to-Coast, To Give You Fast, Dependable Service.

MALL TOOL COMPANY

7814 S. Chicago Ave., Chicago 19, Ill.

Send me all the facts about MALL
 Screwdrivers Drills

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Company _____

Address _____

MU-64

NEW SHOP LITERATURE

Industrial Filters. An eight-page two-color bulletin issued by Industrial Filtration Co., Dept. 294, Lebanon, Ind., describes and illustrates its Delpark Industrial Filters which feature continuous full-flow self-cleaning fully-automatic disposable belt-type filtration. Information on major features, complete dimensions, and data on capacities of the various filters are included.

Tap Selector. Threadwell Tap & Die Co., Greenfield, Mass., has issued a two-color pocket-size slide chart which provides basic tap information, making it easy to select the proper drill and lubricant, as well as the proper tap, for each job. Information for both fractional and machine screw size taps includes recommended drill size with decimal equivalent, recommendations for various classes of fit, major pitch and root diameters, and tap limits for various grinds. Additional data includes recommendation of lubricants for tapping a wide variety of

materials, explanation of the various classes of fit and grinds, and a set of charts illustrating the difference in tolerance between tap limits and product limits.

Steel Shop Equipment. Industrial Bench & Equipment Mfg. Co., 98 South St., New Britain, Conn., has issued an eight-page illustrated catalog (No. 653) describing its line of steel shop equipment. The catalog features many new items in laminated wood top benches, smooth top steel benches, pressed steel bench legs, steel bench drawers, work stands, machine stands, tote boxes, welding benches, bench parts, and accessories. Data on construction, sizes, and styles are included.

Rotary Tools. A 12-page illustrated booklet released by Franklin Balmar Corp., N. A. Strand Division, Woodberry, Baltimore 11, Md., lists all Strand rotary tools, including the new carbide cutter for filing and cutting, for use with its line of flexible shaft machines and the Diskette, a portable electric tool. Complete specifications and data on recommended cutting speeds and other related subjects are included.

KUTMORE ADJUSTABLE HOLLOW MILLS

DESIGNED FOR ALL
YOUR HOLLOW MILLWORK



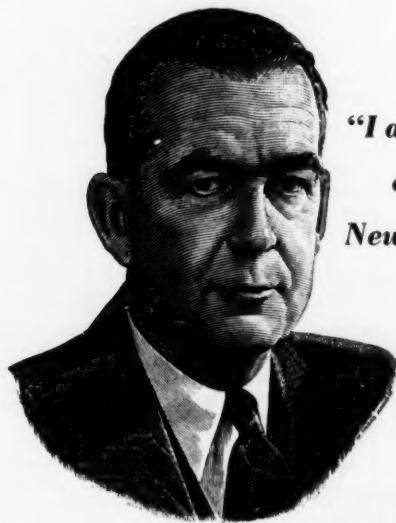
- ANY COMBINATION OF . . . TURNING . . . TAPERING . . . FACING . . . CHAMFERING . . . TREPANNING IN ONE PASS.
- EXCLUSIVE MICROMETER ADJUSTMENT FEATURE FOR RAPID SET-UP.
- CUTTING CAPACITIES FROM 1/32" TO 2" DIAMETER IN STANDARD STOCK. IMMEDIATE DELIVERY.

WRITE FOR CATALOGUE No. 20 MM

OUR ENGINEERING DEPARTMENT IS AT YOUR
DISPOSAL ON YOUR HOLLOW MILL PROBLEMS

CARL WIRTH & SON, INC.

1625 CLINTON AVE. NO.
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***"I am one of many thousands
of the employees of
Newport News Shipbuilding."***

R. I. FLETCHER

Vice President and Comptroller
Newport News Shipbuilding and
Dry Dock Company

"United States Savings Bonds are an ideal backlog investment for every employee, whatever his age or his earning bracket. When bought automatically and conveniently through the Payroll Savings Plan they are almost 'painless' savings. I am one of many thousands of the employees of Newport News Shipbuilding and Dry Dock Company who regularly save every payday for investment in Savings Bonds through our Payroll Savings Plan. The security of the Nation rests upon the security of its individual citizens and all employees who practice the American habit of thrift are contributing to the national security as they provide for their own future."

Fortunately for America, industry and business recognize that "the security of the Nation rests upon the security of the individual."

More than 45,000 companies offer their employees the Payroll Savings Plan. In many of these companies more than 60% of the employees are Payroll Savers—in some, participation is 75%, 80%, and higher.

Upwards of 8,000,000 men and women are enrolled in the Payroll Savings Plan. The 1954 goal—9,000,000—can be exceeded if you and other executives will take a personal interest in your company's Payroll Savings Plan. For information or help in building a successful Plan, write to Savings Bond Division, U. S. Treasury Department, Washington, D. C.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

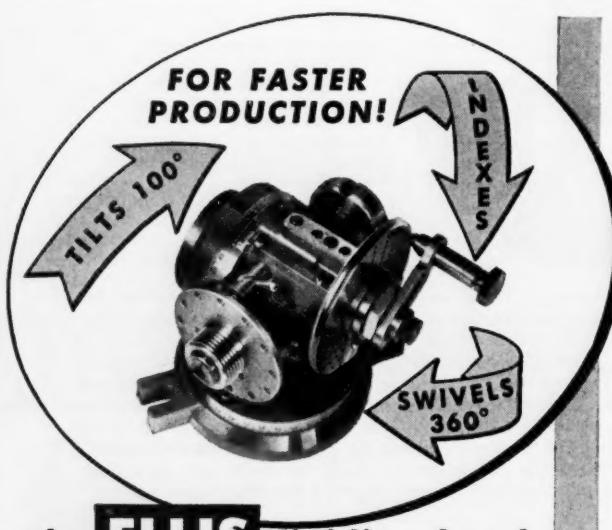
MODERN MACHINE SHOP



"Working Together for Safety" is the title of a 32-page two-color booklet, issued by the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill., which contains instructions in safe work habits applicable to employees in most plants. The practical experiences of workers, supervisors, and safety specialists have established the safe practices covered, beginning with a list of general safety regulations and continuing with special sections on machine operation, hand tools, power tools, protective clothing, fire prevention, materials handling, and many other related topics.

Induction Heating Equipment. A 36-page two-color catalog released by Lepel High Frequency Laboratories, Inc., 55th St. & 37th Ave., Woodside 77, New York, N. Y., fully describes and illustrates its line of high-frequency induction heating equipment for heat treating, metal joining, bombarding, and melting. Complete specifications and information on work handling equipment and accessories are included.

Precision Double-Spindle Grinders. For production officials, Gardner Machine Co., 428 E. Gardner St., Beloit, Wis., has issued a 28-page two-color catalog (No. D-53) illustrating and describing its complete line of precision double-spindle grinders which are designed primarily to grind two opposed parallel surfaces in one operation. Data on several redesigned models and 16 representative types of Gardner work-carrying fixtures which can be adapted to the machines are included.



the ELLIS dividing head

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions—swiveling in two planes—will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

76-H MAMARONECK AVE., WHITE PLAINS, N. Y.

NICHOLS-MORRIS CORP.

WRITE

Screw driving Tools. A 60-page illustrated catalog (No. 21) released by The Apex Machine & Tool Co., 1027 Patterson Blvd., Dayton 2, Ohio, contains complete specifications and prices on its line of production screwdriving tools, including bit holders, insert bits, power bits, hand drivers, offset drivers, and finder sleeve assemblies. Combination tools, comprised of Apex hand drivers, service drive bit holders and insert bits, and Apex sockets, are also described in the catalog.

GENUINE INDUSTRIAL DIAMOND



NEW! DYMOND CUT WHEEL DRESSER

- Freedom from vibration.
- Increased grinding speed.
- Extends grinding wheel life.
- Minimum burning.
- Greater accuracy.
- Better finish.
- Priced at \$10.00. F.O.B. Detroit.

H. B. HAZERODT Associates
414 Ford Bldg. Detroit 26, Mich.

GREATER CAPACITY... COMPACT IN SIZE!



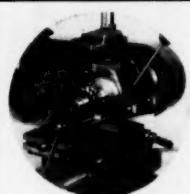
New STERLING "DB" Drill Grinder Sharpens $\frac{1}{8}$ " to $2\frac{1}{2}$ " drills without collets or chucks. Handles 2, 3 and 4 lip drills without extra attachments. Rugged, fast, accurate.

OTHER MODELS: Sterling Model G, Universal and Plain, Tool and Cutter Grinders. • Sterling Model "DA" Drill and Carbide Tool Grinder.

Write TODAY for complete details

MCDONOUGH MANUFACTURING COMPANY

1521 Galloway • Eau Claire, Wisconsin



Straddle milling using our standard stub arbor.

The low speed spindle drive was developed for straddle milling and slitting.

Special Accessories shown on this mill are optional at extra cost.

It's an Even Greater BARKER MILL when equipped with our

SPECIAL LOW SPEED SPINDLE DRIVE, BELT GUARD, CUTTER GUARD, VISE, STUB ARBORS and RISER BLOCKS

The Barker Engineering Dept. has given particular attention to the design and development of special accessories for use with this versatile mill.

BARKER MILLS ARE USED TO BUILD MORE BARKER MILLS... and by utilizing these accessories on our own mills, in our own plant we have virtually accomplished "miracles" on our production line...

— WRITE TODAY FOR BRAND NEW, UP-TO-DATE LITERATURE and ACCESSORY INFORMATION with complete data on latest BARKER DEVELOPMENTS

BARKER ENGINEERING COMPANY

500 GREEN ROAD
CLEVELAND 21, OHIO

"Design-and-Build," a 12-page two-color booklet for the manufacturing and production executive published by Ace-Central States Machine Tool Co., 3801 Trenton St., Detroit 10, Mich., dramatizes two new cost-cutting developments in American industry — the trend toward completely automatic manufacturing equipment and the combining of basic services in creating automatic machinery and special tooling for modern production lines. The illustrated booklet describes the services and facilities made available by Ace-Central States Machine Tool Company, which was recently established by Ace Tool & Die Company and Central States Engineering Corporation, both of Detroit.

Perishable Metal Cutting Tools. Falcon Tool Co., P. O. Box 4605, Detroit 34, Mich., has published a catalog on perishable metal cutting tools.

"People Work Better When They See Better" is the title of a brochure released by Edroy Products Co., Dept. P, 480 Lexington Ave., New York 17, N. Y., which describes the eight models of the "Magni-Focuser," a binocular magnifier for the inspection of small parts.

Height Gage. A four-page three-color catalog released by Fairfield Gauge Co., Inc., 174 Herbert St., Bridgeport 6, Conn., describes and illustrates its Micro-Height Gage, a precision instrument for fast layout and measuring, which is said to combine the easy reading of a micrometer caliper with the scribing features of a vernier height gage. Data on features and prices are included.

Locknuts. An eight-page two-color bulletin issued by Security Locknut Corp., North Ave. & 15th Ave., Melrose Park, Ill., fully describes and illustrates the Security Locknut which is a combination of a standard nut and a retainer fabricated into a single standard nut. Complete specifications and dimensional drawings are included.

Hack Saws, Band Saws, Shear Blades, and Flat-Ground Die Steel. A 16-page three-color catalog released by Simonds Saw & Steel Co., Fitchburg, Mass., fully describes and illustrates its line of "Red End" hack saws, metal-cutting band saws, "Tungsweld" shear blades, and "Red Streak" flat-ground die steel. Information on various applications, as well as specifications, is included.

TUMICO

Precision Made HAND TOOLS



● Tumico calipers, dividers, scribes, etc., are made to satisfy the craftsmen who demand precision quality in all tools. These instruments are made with the same care and to the same standards as Tumico micrometers.

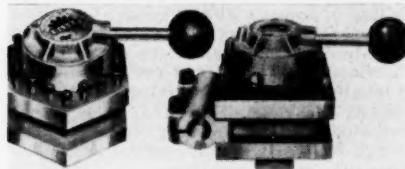


WRITE FOR CATALOG showing complete line of Tumico micrometers, dial indicators, gages and all types of precision measuring instruments.



TUBULAR MICROMETER CO., BOX 40, ST. JAMES, MINN.

"WEDGE-LOCK" TURRET



Does not raise up when indexing in all 12 positions. 4-way and 6-way block models. Repetitive accuracy to within .0003 plus or minus within itself.

WRITE FOR FOLDER

Makers of Combination Rotary Tables and Angle Plates. Also Helical Gear Speed Reducers, Single and Double Reduction. Also Special Gears of All Types.

Open territory available to representatives.

OLSON INDUSTRIAL PRODUCTS, INC.

40 W. WATER ST. • WAKEFIELD, MASS.

SOLD THRU LEADING SUPPLY HOUSES

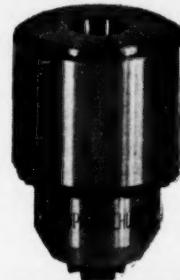


GROBET CHATTERLESS COUNTERSINKS

Six staggered cutting edges give shearing cut that eliminates all chatter.

Send for catalog BC1.

GROBET FILE CO. of AMERICA, INC.
421 Canal Street
N. Y. 13, N. Y.



FOR BETTER MARKING

Use Imperial Marking Dies

The highly accurate, and precision made Supreme Chuck, manufactured by the Supreme Products Co., Chicago, must have the same top quality marking. Imperial Marking Dies give fine detail, accurate marking, and the long life so necessary when marking on this tough alloy tool steel.



From the smallest to the largest requirements on stamps, roller dies, typeholders, or machines, we are equipped to deliver promptly, quality marking equipment.

ATTENTION MANUFACTURERS REPRESENTATIVES:—

Several Desirable Territories Open — Write for Details.

Imperial STAMP & ENGRAVING CO., INC.

4458 No. Western Ave.

Chicago 25, Ill.

COrnelia 7-5882

Standard and Special Carbide Tools. Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich., has released a 92-page two-color catalog which contains complete listings on Super Standard Carbide Tools, sizes, and engineering information. Shadow indexed for ready reference, the catalog provides data on many of the company's new carbide tools cataloged for the first time, including an extended line of solid carbides.

Turret Lathes. Morey Machinery Co., Inc., 410 Broome St., New York 13, N. Y., has published a six-page two-color catalog (No. 579), which describes and illustrates its Nos. 2, 3, and 4 Turret Lathes designed to take full advantage of tungsten carbide tools. Complete specifications and dimensional drawings are included.

Quills. Everede Tool Co., 2000 N. Parkside Ave., Chicago 39, Ill., has issued a four-page two-color bulletin describing and illustrating its line of quills for solid triangular tool bits of carbide, high-speed steel, Tantung, or Stellite. Specifications and dimensional drawings are provided.

Industrial and General-Purpose Pumps. Tuthill Pump Co., 939 E. 95th St., Chicago 19, Ill., has issued two catalogs featuring its line of industrial and general-purpose pumps. Catalog No. 101 covers the complete line of Model L Series of small industrial pumps designed for lubricating, hydraulic, transfer, circulating, and burning oils service. Catalog No. 102 presents the Model C Series of general-purpose pumps for use with non-corrosive liquids with lubricating qualities.

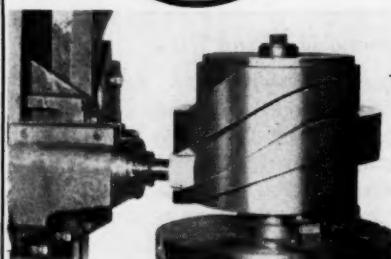
Filtration Equipment. An eight-page two-color bulletin (No. A943) issued by U. S. Hoffman Machinery Corp., Industrial Filtration Division, Thompson Rd., Syracuse 6, N. Y., graphically presents the essential features and applications of its 10 basic types of industrial filtration equipment, including disc, cartridge, and pressure-type filters, flotation units, vacuum stills, magnetic separators, and oil conditioners.

Spline Plug and Ring Gage Tolerances. A slide chart which provides the basic tolerances for spline plug and ring gages having pitch diameters up to 8 inches has been issued by Vinco, 8855 Schafer Highway, Detroit 27, Mich. Said to be helpful to anyone designing or inspecting spline gages, the chart contains explanatory notes concerning tooth thickness, parallelism, concentricity, and major and minor diameter tolerances.

Automatic Turret Lathes. An eight-page two-color bulletin (No. 145) released by Potter & Johnston Co., Newport Ave., Pawtucket, R. I., fully describes and illustrates its Model 3U Speed-Flex Automatic Turret Lathe which has spindle speeds ranging from 73 to 1,445 r.p.m. Data on features and special tooling, line drawings, and specifications are included.

Hand and Power Hack Saws and Band Saws. A 28-page two-color booklet released by Clemson Bros., Inc., Middletown, N. Y., tells how to cut metals properly with hand and power hack saws and band saws. Included in the pocket-sized booklet are rules for selecting and using hack saw blades and frames; data on right and wrong way to saw a piece of metal; table describing the causes and cures for blade trouble; section on how to select and use power hack saw blades; explanation and breakdown of the number code for power blades; and information on right and wrong way to adjust a band saw blade.

Rowbottom for Cams



A New ROWBOTTOM SERVICE. CAMS GROUND after HARDENING

Advantages:

1. Longer life
2. Less down time for repairs
3. Higher load capacity

Write—Send us your drawings for quotation.

The Rowbottom Machine Co., Inc.
P. O. BOX No. 4097 • WATERBURY 14, CONN.

Drill Jig Bushings. A 12-page illustrated price list (No. E-649-A) released by Colonial Bushings, Inc., 31780 Groesbeck Highway, Fraser, Mich., contains prices and dimensional drawings of all standard drill jig bushings and liners with dimensions and tolerances in table form for all sizes, as well as perspective illustrations of representative special bushings. The price list is designed for use in conjunction with the company's catalog No. B-649.

Permanent Magnets. A new magnet price list (No. PM-114) released by Carboloy Department of General Electric Co., 11143 E. 8 Mile Blvd., Detroit 32, Mich., contains the recently increased prices for the company's permanent magnets, including Alnico type, sintered and cast, Carboloy permanent magnets.

Worm Gearing. A 36-page two-color bulletin (No. CD-173) released by Cone-Drive Gears Division, Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich., documents 95 successful applications of worm gearing in 20 different industrial classifications. The gears are described and illustrated, and specifications are provided.

Adjustable Speed Drive. A two-color illustrated bulletin published by Rogers Machine Works, Inc., 1400 Seneca St., Buffalo 10, N. Y., fully describes the adjustable speed drive which is said to provide unlimited table chuck speeds up to 212 r.p.m. when used on its "Perfect 36" Vertical Turret Mills. Specifications are included.

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"Adhesives, Coatings, and Sealers" is the title of an eight-page two-color illustrated bulletin released by The Adhesives & Coatings Division, Minnesota Mining & Mfg. Co., 423 Piquette Ave., Detroit 2, Mich., that lists the most important adhesives, coatings, and sealers which 3M produces. The bulletin enables the reader to determine at a glance what type of product is best suited to his particular manufacturing problem.

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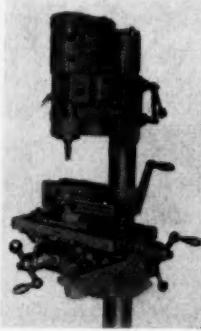
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Sheet Metal Fabricator. An eight-page two-color catalog (No. 10-AA) issued by Wales-Strippit Corp., 398 Payne Ave., North Tonawanda, N. Y., fully describes and illustrates the Wales Sheet Metal Fabricator for punching, notching, and nibbling at up to 165 strokes per minute. Information on accessory equipment, dimensional drawings, and specifications are included.

Hydrostatic Testing Machines. Steel City Testing Machines, Inc., 8817 Lyndon Ave., Detroit 21, Mich., has issued a two-color bulletin (Form H353) which describes and illustrates three typical ma-

chines for hydrostatic testing on a production-line basis. The bulletin explains that equipment of this type is designed and built to order to meet customer's specifications and outlines the type of information required in advance.

Bronze Bearings, Bars, and Electric Motor Bearings. A 64-page illustrated catalog (No. 152) released by The Bunting Brass & Bronze Co., Toledo 1, Ohio, contains complete listings of industrial standard stock bearings, bars, and electric motor bearings. The pocket-size catalog contains all bronze bearing information that appears in the company's larger full-size catalog.

Air Valves. A 40-page illustrated catalog (No. 53) issued by Mechanical Air Controls, Inc., 15311 W. 11 Mile Rd., Detroit 37, Mich., fully describes its line of "Mac" Air Valves for the control of single and double-acting air cylinders, as well as for allied applications. Parts lists, dimensional drawings, data on manifold and bottom port locations, and information on typical installations are included.

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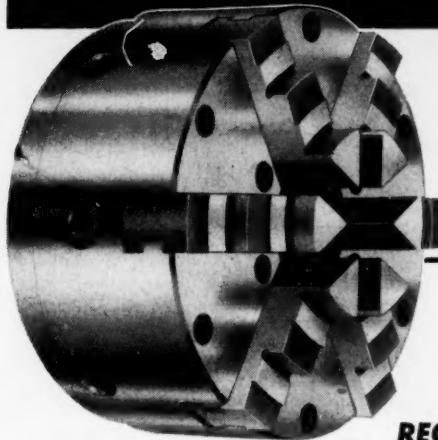
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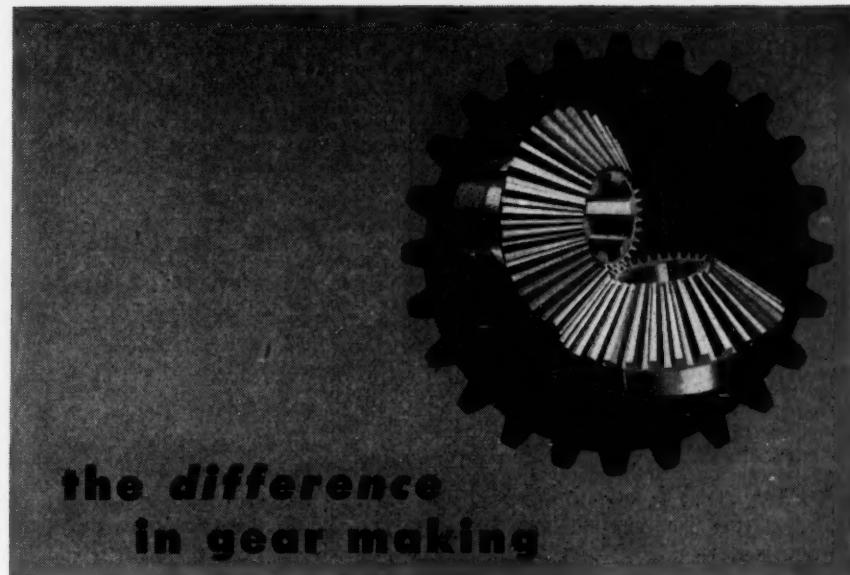
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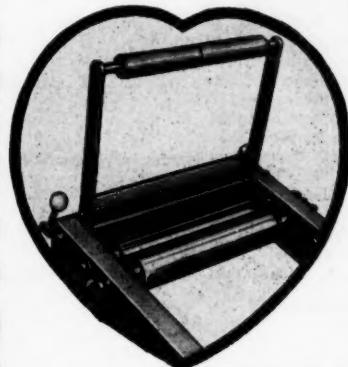
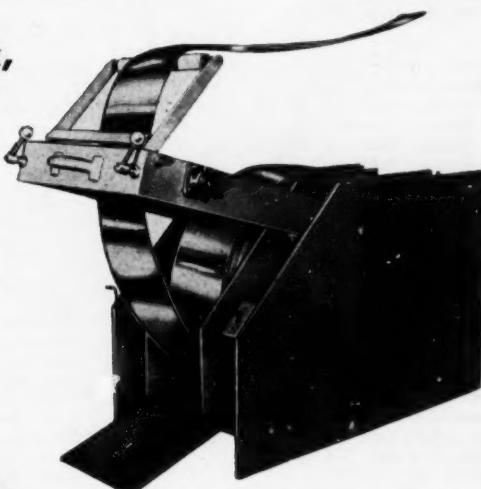
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By J. A. Patterson



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BLANCHESTER, OHIO



the last word

Metal Exposition

FOR many years when the month of October has rolled around we have used space in this column to direct attention to the National Metal Congress and Exposition sponsored by four leading technical societies. We have urged taking time out to view the latest developments on display and to take advantage of the opportunity to discuss problems personally with the outstanding men in the field who present papers before the technical sessions.

We have repeatedly recommended attendance at the Metal Show because we feel so strongly that so much can be accomplished through a free exchange of ideas. This matter of a free exchange of ideas is a cherished American tradition, a tradition which will be maintained only so long as advantage is taken of it.

A visit to this year's Metal Congress where thirty-eight outstanding technical papers are to be presented will help you to do the job ahead just a little bit better.

Training Methods

JUST as the youth of today are the men and women of tomorrow, so the apprentices being trained in today's plants will be the backbone of industry tomorrow—the men who will shoulder the responsibilities of supervising industrial production. The National Machine Tool Builders' Association, in a new booklet just off the press entitled "Key to Survival and Growth," faces the fact that man-

power—trained manpower—manpower trained in accordance with a plan—is essential to healthy survival in the machine tool industry. It asks the question "Should not personnel development at least be accepted as of equal importance with product development?" And questions further, "Unless a company has the right people in management, in production and in sales, where will it be at the very moment when it plans to take proper advantage of its competitive situation?"

The booklet goes on to point out that practically every machine tool company, as a matter of standard practice, spends substantial sums in research and design to develop a new machine that may not be ready for the market in six years, and might in fact never be built at all. The question is then posed "Are not key men as important—sometimes even more important—than research and design?"

"Key to Survival and Growth" outlines certain basic principles which appear common to most of the training programs which have been consistently and successfully in operation for some period of time. Briefly, the booklet will serve as a guide to companies who wish to adapt these principles to their own circumstances. Included in the booklet are specific methods used by a number of companies in the machine tool field.

We feel that "Key to Survival and Growth" is a "must reading" project to accompany any examination of presently used training methods in the metalworking industry.



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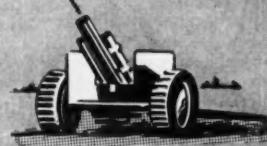


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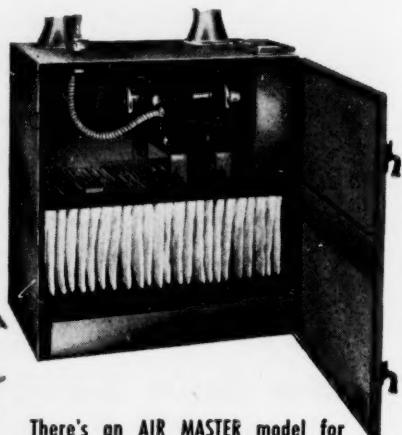
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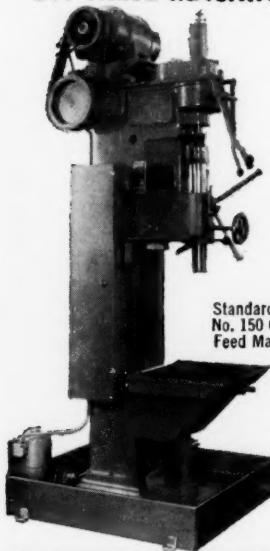
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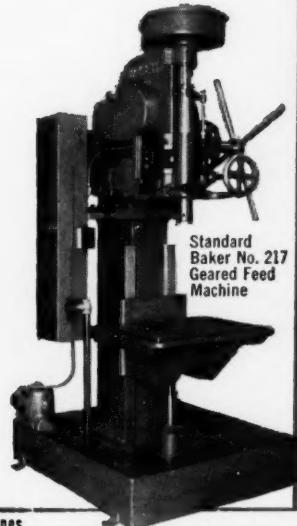
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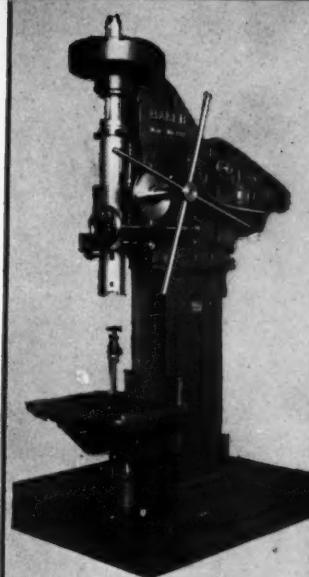
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2. Max. H. P. Motor used.....	7½	7½"	10	15	20
3. Distance center of Spindle to Frame [Gap]*....	11"	11"	12¼"	12¼"	12¼"
4. Maximum Spindle Travel.....	11"	11"	12"	16"	16"
5. Spindle—Outside Dia. splined driving end.....	1¾"	1¾"	2"	2-13/16"	3¼"
6. Dia. of Spindle Sleeve.....	2¾"	2.750"	3¼"	4¼"	5¼"
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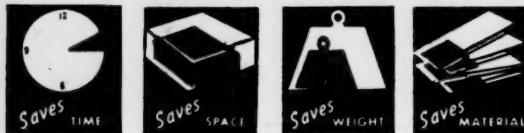
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